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THE PULP AND PAPER INDUSTRY IN ONTARIO -- ECONOMIC ISSUES AFFECTING ENVIRONMENTAL REGULATION

APRIL 1993

Ontario

Ministry of Environment and Energy

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THE PULP AND PAPER INDUSTRY IN ONTARIO -- ECONOMIC ISSUES AFFECTING ENVIRONMENTAL REGULATION

Report prepared for:

Economics Office
Policy Development and Intergovernmental Relations Division
Ontario Ministry of Environment and Energy

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INTRODUCTION

Industrial and municipal effluents which discharge into the Great Lakes pollute the world's largest body of fresh water. The Lakes are a unique resource - their vast economic, social and ecological value is indisputable, but they are also vulnerable to excesses of industrialization and population growth. The Upper Great Lakes, while massive in size and apparent absorptive capacity, take many years to replenish their waters. Lake Superior has a retention period of almost two hundred years, Lake Michigan a hundred, and Lake Huron a much shorter period of twenty two years. The two larger lakes therefore have not been replenished more than three or four times since Champlain first walked on the shores of Lake Huron. Industrialization has been present for only about a half of the water retention cycle and yet its effects are sufficient to give cause for concern. In the Lower Great Lakes, where most of the industrialization is concentrated, the faster flow-through of water has not been sufficient to offset the environmental deterioration accompanying the growth in industrial and municipal discharges. These retention periods illustrate the dangers of pollution, particularly the effects of persistent pollutants that stay in the food chain or in the ecosystem for extended periods of time. These may linger and accumulate in the lakes for decades, even centuries, and affect the ultimate sustainability of the fresh water natural resource base.

The need to conserve and protect the finite resources of the Great Lakes' extensive ecosystem presents a compelling case for stringent and urgent measures of pollution abatement and environmental protection. But, time and cost are legitimate and major concerns in environmental programming. Money, technology, human skills and regulatory efforts require skillful blending and delivery within an appropriate time-frame if they are to reap sound and durable benefits.

Public policy is obliged to balance the fact that industry needs time to accumulate cash resources, to carry out investment and adjust its production processes, against the imperatives of environmental and human health -- each additional year of damage adds to the long-term social and ecological cost.

The economic and human costs of environmental damage are frequently difficult to measure in the short-term, and on occasion, the long-term costs of neglect become evident only when the damage is extreme. The unusual decline in life expectancy and the increase in respiratory diseases in parts of Eastern Europe during the past four decades were the direct result of a serious neglect over many years of urban and work place air quality, and, the absence of sound investments in environmental protection. Continuous long-term investments in protecting the environment are as important as periodic modernization of industrial plant for competitive reasons. The experience in the United States and in European countries indicates that with the right mix of regulations, incentives, and programs, the environmental benefits can be accompanied by superior industrial competitiveness, better job security and higher real incomes.

The management of large-scale ecological and economic change of the kind envisaged by the Municipal Industrial Strategy for Abatement (MISA) can be assisted by an understanding of the factors which influence the ability of key players to adapt to new rules. This paper examines some of the main economic issues surrounding the Ontario pulp and paper industry in its international and domestic contexts. In doing so, it examines the nature of the business environment which determines industry and government maneuverability in the application of new regulatory limits on the disposal of water-born contaminants into the Great Lakes.

EXECUTIVE SUMMARY

The Structure and Growth of the Industry In Ontario

- Investment in new plant and equipment, and repairs, by the pulp, paper and allied products industry in Ontario has not kept pace with the rest of Canada. It has fallen from 30% of the national total in the early 1970's to less than 20% in 1990. Except for one recent new recycling plant in Southern Ontario, greenfields plants have been a rarity.

- Ontario pulp capacity has not grown in recent years: newsprint continues to expand, but mainly for ONP recycling. Ontario supplies about 14% of U.S. market demand for newsprint.

- Long-term changes in the industry's structure with shifts towards high-growth products and export market diversification have been undertaken in Ontario, but the trend has been much more aggressive in other Eastern Canadian provinces.

- Pulping capacity has experienced a long-term change in composition in Canada: mechanical pulping processes (CTMP and TMP) have risen rapidly in importance and made Quebec a world leader in the application of this technology -- but in Ontario kraft pulping forms the major portion of capacity and there are no major CTMP operations.

- On both sides of the Canada-U.S. border, pulp and paper capacity has expanded to meet new product demands. Quebec's capacity in these products has grown faster and with a more sustained momentum than Ontario's.

- Newsprint is a declining share of production capacity in Ontario and Quebec while printing and writing papers have expanded.

The Industry's Role in Ontario's Regional Development

- The industry has been a strong development force in certain regions of the province. Value-added is high by manufacturing industry standards - but for the average plant the level is not up to the best international standards for the pulp and paper industry.

- The purchases of supplies and equipment by pulp and paper companies located in Eastern and Northern Ontario exceeds $1.5 billion a year -- much of which would be in regional markets. The paper and allied products industry adds over $1 billion a year in wages and salaries to the economy. The replacement of its economic impact by fiscal equivalents would be a substantial cost to government.

- Single industry dependency is high in most pulp and paper communities in Northern Ontario. In nine of the thirteen Northern communities whose paper companies are subject to MISA, the level of dependence on the industry, excluding contract woods workers, is one in five jobs or more. In seven of the nine, it is one job in three.

The International Competitive Environment

- The industry has been criticized frequently for a lack of concern for technological innovation and Research and Development expenditures. At 0.3% of sales, R&D expenditures are unusually low by manufacturing industry standards.

- Many of Ontario's newsprint mills have a serious competitive problem: the machinery, on average is slower, older, smaller and less productive than those in Southern U.S. states. Half of Ontario's newsprint machines are increasingly vulnerable to closure because of obsolescence.

- The industry in Ontario does not rank highly in output per machine compared to the U.S., B.C. and Scandinavia. Only Quebec mills, on average, have a worse competitive position.

- The achievement of higher machine speeds through adaptation is unlikely to permit Ontario's older mills to keep up indefinitely with the larger and faster machines in other competing jurisdictions. Significant restructuring of the industry will be difficult to avoid in the 1990's.

- The rising economic and competitive power of the U.S. pulp and paper industry will be a problem during the 1990's for the Ontario sector. Growth in competitive, modernized newsprint and pulp capacity which threatens Ontario producers is most rapid in North Central and the South Eastern U.S. Other areas of the U.S. are growing very slowly or not at all.

- Capacity utilization of pulp and paper plant swings widely over the average business cycle and is a key factor in determining profitability -- Canadian average utilization rates are currently around 80%, some 10-15 percentage points below those in the U.S.

- The Swedish and Finnish policies for the optimum use of the forest resource are expressed in industry's fibre strategy and in the choice of products and production systems which are technology-intensive: with relatively high wood costs, their business strategy aims at value-added production, and the conservation and expansion of the forest resource base.

- Ontario's fibre strategy is based on the concept of maximum sustainable yield. It does not extend to influencing the choice of the production system or markets, products and customers. Its hardwood resources are relatively underutilized.

- Canada's degree of public ownership of the forest resource is unique among the pulp and paper producing countries and its pricing mechanisms for use of the resource are different in that they rely much less on the private market than in other countries to set the price to companies of the forest resource.

- Competition from secondary fibres will increase in the 1990's. The U.S. market, including its large export sales, will play a key role in setting Canadian prices. In central Canada by the mid-1990's the new and planned capacity additions for recycling will create a possible shortfall of local ONP supply -- Quebec plants are likely to have to import substantially. While Ontario plants will be much closer to balancing supply and demand some projections point to the possibility that recycling plants in the province by the mid-to-late 1990's will need to import up to 100,000 tonnes of product annually from the U.S. to supplement local supply.

- The industry's earnings are sensitive to the business cycle and are currently in a severe downswing. Losses on Canada-wide operations by four of Ontario's largest companies since mid-1990 have exceeded $800 million. Past experience with business cycles suggests that the accumulated losses will probably be recouped by the industry in the economic recovery, but the slowness of the current recovery and increasingly complex competitive conditions could indicate that it will be at a slow and prolonged rate.

- Expenditures on end-of-pipe environmental abatement by Ontario's pulp and paper industry as a percentage of total investment have dropped significantly since the early 1980's falling from levels of 10% to 3.5%.

Long Term Economic Trends

- World demand for pulp and paper products is growing at a trend rate of 3%-4% a year. Per capita consumption of pulp and paper products is closely linked to the level of GNP per capita. The U.S. consumes more than any other nation at 311 kilograms per capita per year. European per-capita consumption varies from 98 kilograms in Ireland to 279 in Finland. The potential world demand for pulp and paper products is therefore large since many countries have consumption levels well below those of North America.

- Europe and North America have production capacity surpluses relative to continental demand. The pulp and paper markets of the two regions do not overlap significantly. Swedish and Finnish competition in North America is marginal in volume. Within North America however, competition is strong between producers in both Canada and the U.S..

- Per capita consumption of newsprint rose during the 1980's in North America: it has recently declined. Less demand for newsprint and possibly the growth of substitute materials and other news media have reduced the amount needed by a growing economy. Future demand may therefore not be as buoyant as it was in the mid-1980's. A return to trend growth of 2% a year in U.S. demand volume is projected as likely for the 1990's.

- Over the past twenty years, the price of pulp and paper products, in general, has approximately kept pace with the general deflator for Gross National Product. The future pricing climate will remain highly competitive. It will be affected by the expansion of secondary fibre production as a growing competitive force in North America, and, by the expansion of the U.S. newsprint industry which generally has newer, faster and more efficient machines.

Conclusions

- The environmental economics of the pulp and paper industry have unavoidable implications for the Province's economic and industrial

policy. The harmonization of environmental policy design with economic policies would be assisted if both policy areas could be provided with a common link to the goals of sustainable development. This might be achieved within the framework of a "fibre strategy". To understand better the basic conceptual framework for such an integration requires research into three relevant areas of concern.

- More research is necessary to define the elements of a "fibre strategy" of the kind which could relate environmental policies to the goals of "sustainable" development and "value-added" manufacturing development.

- The low level of research and development by the industry requires further comparative study of how technology has been used in other jurisdictions to remove (or lower) economic barriers to environmental abatement programs.

- More research would be useful on the comparative economics of operating scale, product scope and international competitiveness of the industry in Ontario. Research of this kind his would provide essential background data for the planning and negotiation of environmental measures.

1. THE STRUCTURE AND GROWTH OF THE INDUSTRY IN CANADA AND ONTARIO

The composition of the Ontario pulp and paper industry changed over the course of the 1980's. While the industry has expanded non-newsprint product lines it has also maintained a substantial but diminishing reliance on newsprint and pulp. The province's share of national production in all major pulp and paper products declined -- as has its share of total investment in the Canadian industry. The Ontario industry's predominantly chemical kraft pulp capacity is not growing at the present time, and it has no major CTMP facilities, but its newsprint capacity continues to expand - mainly in recycling facilities. In the 1980's, the industry in the rest of Canada, which is less dependent on chemical pulping, moved towards a greater dependence on the newer forms of mechanical (CTMP) pulping - and that capacity continues to expand.

Defining The Pulp and Paper Industry

The pulp and paper industry, as defined by Statistics Canada has several major components. In analyzing the industry and reviewing the available data it is useful to have a definition of those components as they are commonly employed.

The Standard Industrial Classification system employed by Statistics Canada recognizes four types of manufacturing under the general heading of Paper and Allied Industries (S.I.C 27):

Pulp and paper: (SIC # 271) which covers plants that manufacture pulp, newspaper, paperboard, building board, and other paper.

Asphalt Roofing: (SIC #272) includes plants producing roofing felts and asphalt shingles

Paper Boxes and Bags: (SIC # 273) covers plants which make folding carton and set-up boxes, corrugated boxes, paper bags.

Other Converted Paper Products: (SIC # 279) consists of plants that use outputs from pulp and paper mills to produce coated and treated paper, stationery, paper consumer products, other converted papers.

The MISA regulations are generally applicable to pulp and paper plants which discharge directly into lakes and rivers. The focus of this paper is on Pulp and Paper mills (S.I.C. # 271), although from time to time the limitations of data availability require the use of the

broader definition of the industry, which is Paper and Allied Products.

How Pulp Industries Are Defined

Whereas paper companies are usually defined according to end products, such as newsprint, or linerboard, the pulp industry, is more often categorized according to the way in which the product is manufactured. Each type of pulp lends itself to certain kinds of paper production. *(Karel M Jegr, and, the Canadian Pulp and Paper Association - References #4 and #5)* There are five main technical avenues for the production of pulp:

- chemical
- semi-chemical
- mechanical
- chemi-mechanical
- defibrated/exploded

The most common forms of pulp production are chemical. In these the pulpwood is cooked in a chemical mixture to separate the lignin from the cellulose fibres. Applications of chemical pulps include: newsprint, paper bags, boards and cellulose products such as film and fabrics.

There are two kinds of chemical pulping: sulphite, which uses an acid mixture in the cooking process; and sulphate (kraft), which employs alkaline. Of the two processes, sulphate is the more versatile in terms of wood species it can accommodate and the kinds of product that can be manufactured from the pulp. The quality and type of paper fibres produced by kraft pulping vary with the kind of wood that is used and the ancillary processes employed, such as bleaching.

Sulphate Pulp

Softwoods form the major part of the commercial wood inventory in Ontario. Those with a high resin content, such as pines, when put through a sulphate (kraft) process produce a long, high-strength, coarse, fibre; while those with a low resin content, such as balsam, fir, spruce, hemlock produce slender, easily bleached fibres that make good materials for fine papers.

Hardwoods such as birch, poplar, beech, maple and eucalyptus can also be pulped by the kraft technology. Hardwoods which are kraft processed produce shorter fibres of lesser strength than the softwoods. However, these fibres have other useful qualities in paper making such as bulk, surface smoothness and high printing qualities. Ontario has a smaller proportion of hardwoods than softwoods - which constitute the main raw material of Ontario's pulp industry.

Other Chemical Processes

Semi-chemical pulps require that the wood chips are first cooked in either an acid, neutral or alkaline mixture, and subsequently treated mechanically to separate the fibres. The end fibre produced is best suited to heavy paper products such as container boards.

Dissolving, alpha, or semi-chemical pulps are more highly refined grades of pulp with a high level of cellulose. They are used for specialty non-paper

products such as rayon, acetate, films, plastics and chemicals. These pulps constitute a very small proportion of total production in Ontario and Canada.

Mechanically Produced Pulps

In its simplest form, mechanical production of pulp involves the grinding of bolts or logs of wood into separated fibres. This is known as stone groundwood pulp and is well suited to newsprint and low-cost papers. The process is most amenable to the pulping of softwoods.

More recent and advanced forms of mechanical processing include the treatment of wood chips using combinations of pressure, temperature and chemicals. Generally, these pulps produce a higher yield of cellulose for a given volume of wood used and they have fewer of the environmental problems associated with other forms of pulping, but their energy and capital costs can be higher. Pulp manufactured from chips and residue at atmospheric pressure is known as Refiner Manufactured Pulp (RMP). Pulp from these sources which is manufactured under conditions of higher temperature and pressure is called Thermomechanical Pulp (TMP). These forms of pulp are used to reduce the chemical pulp content in newsprint and groundwood papers.

The addition of chemicals in the pulping process before heating and mechanical defibration produces Chemi-mechanical pulp, or Chemi-thermal mechanical pulp (CTMP).

Defibrated pulp utilizes wood chips which are processed with a combination of high temperature steam, and mechanical treatment so as to separate the fibres.

Trends in The Industry 's Capacity Utilization and Investment

For a capital-intensive industry, the annual fixed costs of new, under-utilized plant can be high. These fixed costs have a greater significance for profitability than in labour-intensive industries where operating costs can be trimmed substantially in a demand downswing by means of lay-offs. It is the nature of the pulp and paper industry, however, that it must invest in the exploitation of the forest resource on a long-term basis and be ready for periods of rapid expansion. To achieve this it has to generate the cash flows necessary to carry it through a variety of economic and competitive climates. The business cycle is an important determinant of the dynamics of the industry's cash flows, its plant utilization rates and its investment activities.

The Industry Is Sensitive to the Business Cycle

The utilization of newsprint production capacity is very responsive to the North American business cycle: in Canada it has ranged from a low of 82% in 1982, to 99% in the late 1980's. This swing of some 17 percentage points in the utilization of plant and equipment over one business cycle, provides one indicator of the need for good judgment and careful financial planning concerning the

timing of investments in the pulp and paper industry.

The achievement of low unit costs and short pay-back periods, (the number of years required to recover capital outlays) requires that companies take full advantage of the upswing side of the business cycle when demand is growing and plant and equipment can be more fully utilized. Even if new investment in plant and equipment involves potential cost-savings it will become a drain on corporate earnings if it is not employed at high levels of utilization.

For those companies investing in secondary fibre processing, the objective must be to bring them up to a high level of capacity utilization as soon after start-up as possible. The recent addition of large new recycling plants in Ontario, Quebec and the U.S. to process secondary paper fibres will push other parts of the industry (using virgin fibre) towards a lower level of capacity utilization in the medium term.

For chemical pulps and paper board, the range of Canadian plant utilization rates during the present business cycle has been wider than for newsprint. For chemical pulps it has swung from 76% in the business cycle trough (1982) to 96% at the peak (1988-89) --- a fluctuation of 20 percentage points. For paperboard the range has been even wider, varying from 74% in the trough to 100% at the peak - a swing of 26 percentage points.

The investment and production picture for the Ontario pulp and paper industry within the Canadian sector has some ambiguous features. The share of national investment in repairs and new capital equipment in the Ontario sector has diminished considerably. This is illustrated in *Figure 1* which shows the expenditures by Paper and Allied Industries in Ontario and Canada over the period 1975-1990. (The Statistics Canada definition of the industry in this survey is a little broader than Pulp and Paper products, but it provides a good directional guide becausethose products form the bulk of the Paper and Allied Industries sector.)

Ontario's Share of Investment is Down

In 1975, the Ontario industry invested $283 millions in capital and repairs -- about 27.5% of the Canadian total of $955 millions. By 1990, the Ontario figure had risen to $1.2 billion, but had dropped to 19.4% of the national total of $6.4 billion. This drop in investment share has not, as yet, (mid-1992) had the equivalent impact on production.

Alongside this apparent loss of position on the investment side, the Ontario industry has shown a lesser, although still significant decline in its share of the volume of national output in pulp and paper products in general. *Table 1.1 (over)* examines three items: paper products, woodpulp, and the combined tonnages of paper products and pulp. It shows how Ontario's share of Canadian production for each of these three items has changed over time. There has been a gradual downward drift in Ontario's share of Canadian output of woodpulp and paper products of all kinds.

Table 1.1
Ontario and the Rest of Canada
Pulp and Paper Industry Volume of Output
1970 - 1990
(000's metric tonnes)

	Pulp		Paper		Percent Ontario		Canadian Output		
	Ontario	Rest of Canada	Ontario	Rest of Canada	Pulp %	Paper %	Pulp 000's Tonnes	Paper	All Products
1970	3,601	13,008	2,883	8,370	**21.7**	**25.6**	16,609	11,253	**27,862**
1975	2,540	12,616	2,099	7,967	**16.8**	**20.9**	15,156	10,066	**25,222**
1980	4,101	15,953	3,520	9,968	**20.4**	**26.1**	20,054	13,488	**33,542**
1985	4,097	16,384	3,733	10,705	**20.0**	**25.9**	20,481	14,438	**34,919**
1990	4,188	18,648	4,088	12,438	**18.3**	**24.7**	22,836	16,526	**39,362**

Source: Canadian Pulp and Paper Association (Ref #7)

Together, *Figure 1* and *Table 1.1* show that while capital and repair expenditures on plant and equipment in Ontario have lost some of their share of the Canadian total, the relative decline in investment has been more pronounced than the loss of production share. This may be an indicator that the Ontario industry has been successful over the past two decades in adapting and modifying older equipment and thus in using its capital stock relatively efficiently - even though much of it is now aging.

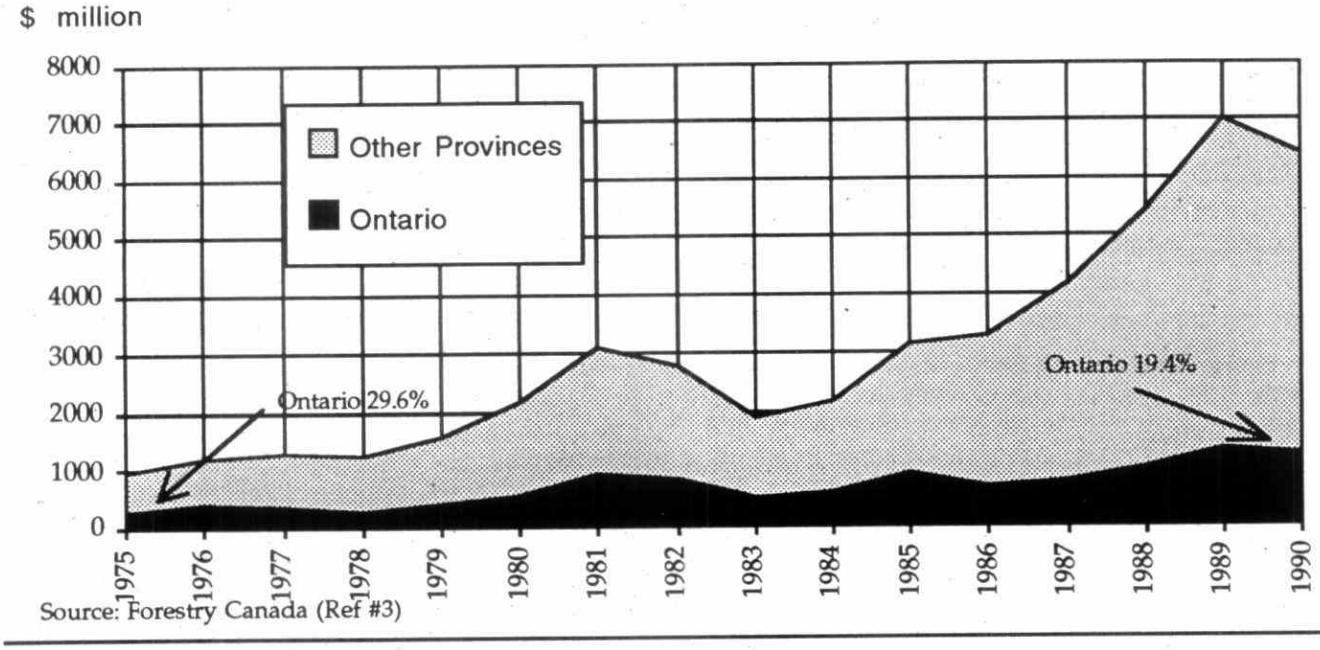
Table 1.2
The Canadian Pulp Industry
1980 - 1993
(000's Tonnes of Annual Capacity)

Year	Sulphite	Sulphate	Mechnical	Dissolving & Alpha	Semi Chemical	Total
1980	2,488	10,081	8,550	307	438	21,864
1993	1,387	12,767	13,441	247	523	28,365
Change	-1,101	2,595	4,891	-60		6,251
% 1980	**11.4**	**46.1**	**39.1**	**1.4**	**2.0**	**100**
%1993	**4.9**	**45.0**	**47.4**	**0.9**	**1.8**	**100**
% Change	**-44.3**	**26.6**	**57.2**	**-19.5**	**19.4**	**28.6**

Source: CPPA (Ref #5)

Figure No 1

Annual Investment Pulp & Paper ($ millions)



Source: Forestry Canada (Ref #3)

The implication of this data, and of the most recent capacity additions across Canada, may be that Ontario will experience further and more noticeable declines in its share of national pulp and paper output in the 1990's as the competition from other regions intensifies. It also raises questions about the relative efficiency of the average plant in Ontario -- which in a later chapter is shown to be a significant problem for newsprint in particular.

Changes in The Composition of the Canadian Pulp And Paper Industry 1980-1993

During the 1980's, the pulp and paper industry across Canada underwent changes in its composition as a result of investment in new plant, repairs and adaptations of existing plant, and the retirement of obsolete equipment. The sections which follow outline some of these changes and show how they varied among the regions of Canada.

The figures in *Table 1.2* show that the current distribution of pulping capacity in Canada is almost equally divided between mechanical and the combined chemical processes (sulphate, sulphite and, dissolving and alpha). However, the rate of growth of the various methods of pulping has not been uniform. A decade or more ago, the balance was more definitely in favour of chemically produced pulps.

Within the chemical category, the sulphite and dissolving pulps were small in the early 1980's, but a little more sig-

Table 1.3
The Canadian
Paper and Board Products Industry 1980 - 1990
Annual Capacity
('000's metric tonnes)

Year	Newsprint	Printing & Writing	Other Paper	Board	Total
1980	9,130	1,642	1,749	2,625	**15,146**
1990	10,100	3,918	1,872	3,023	**18,913**
Change	970	2,276	123	398	**3,767**
% Change	10.6	138.6	7	15.2	**24.9**
% 1980	60.3	10.8	11.5	17.4	**100.0**
%1990	55.5	20.7	9.9	13.9	**100.0**

Source: CPPA (Ref #5)

nificant than they are today. By 1993, sulphite will have dropped from 11.4% of total Canadian pulp capacity in 1980 to 4.9%.

The absolute sulphite capacity, in the meantime, will have dropped by more than 44%. This is a result of the less favourable operating costs of the older sulphite plants compared to a modern sulphate (kraft) plant, and the comparatively more costly outlays required to meet environmental protection standards.

While they have continued to grow, sulphate (kraft) pulps have also lost share because of the growth of CTMP facilities in other areas of Canada The absolute level of production capacity will have risen 2,595,000 tonnes since 1980, but kraft's share of total Canadian woodpulp capacity will have dropped slightly from just over 46% to 45%.

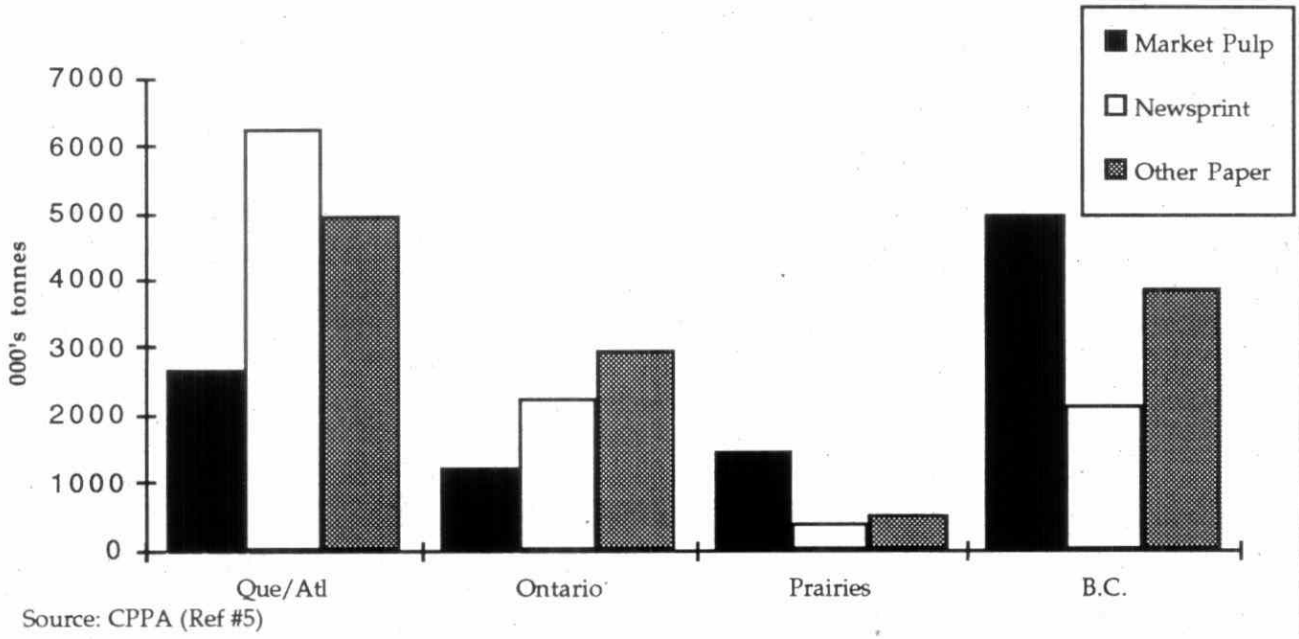
Over the thirteen year period, investments in the newer forms of mechanical pulping will have expanded capacity in those processes by almost twice as much as in sulphate (kraft) pulps: 4,891,000 tonnes, compared to 2,595,000 tonnes; and at a much faster rate: close to 57% compared to 27%. The semi-chemical and alpha pulps have either declined or remained static in their share of capacity; and, the production of both is of comparatively minor significance.

In the same period, among paper and paper board products (as defined by the CPPA) there has been a shift in the focus of Canada-wide investments in new plant and equipment towards expanded capacity in non-newsprint paper products such as printing and writing papers. *(Table 1.3)*

While Canadian newsprint capacity increased in the 1980's by almost a million tonnes, it lost some of its share of the total paper and paper boards to other paper products *(Table 1.3)* It dropped from just over 60% in 1980 to 55.5 % in 1990.

Figure 2

Canadian Regional Pulp & PaperCapacity 1993



Source: CPPA (Ref #5)

The figures for 1993 estimated production capacities show that this share has continued to drop to 52.3% while printing and writing paper have risen to 22.1% of the total. It is interesting to note that the CPPA reports show (Ref # 5) that among the pulps produced for printing and writing papers the fastest capacity growth has been in the newer forms of mechanical pulping.

From a national perspective, the production capacities for market pulp, newsprint and other paper and board - and hence the export capabilities - are distributed across the country. The relatively larger share of export potential in the Atlantic, Quebec and B.C. is illustrated in *Figure 2.* In later sections and chapters the market focus of the various regions of Canada is discussed briefly to show how they have tended to develop differently. Within the changing national picture, Ontario's industry has exhibited longer term trends which are distinct.

Ontario's Production Capacity Has Undergone Some Long-Term Changes In Focus

During the 1980's and into the early 1990's there has been a very slow increase in chemical pulping capacity in Ontario which has compounded at less than 1% a year. *(Table 1.4)* The total increase since 1980 amounts to almost 13%. At the same time, the net expansion in mechanical pulping capacity has also been very low -- only 3.5% over the

Table 1.4
The Composition of Ontario's Pulp & Paper Capacity
1980 - 1993
('000's tonnes)

	1980	1993	Change	% Change	% Composition 1980	% Composition 1993
PAPER						
Newsprint	1,822	2,243	421	23.1	47.0	43.3
Paper & Paper l	1,909	2,779	870	45.6	49.2	53.6
Building Paper	148	161	13	8.8	3.8	3.1
TOTAL PAPER	**3,879**	**5,183**	**1304**	**33.6**	**100.0**	**100.0**
PULP						
Chemical	2,493	2,807	314	12.6	55.6	59.6
Mechanical	1,695	1,755	60	3.5	37.8	37.3
Other	293	145	-148	-50.5	6.5	3.1
TOTAL PULP	**4,481**	**4,707**	**226**	5.0	100.0	**100.0**
MARKET PULP		**1,207**				**25.6**

Source: Canadian Pulp and Paper Association Ref #5

whole period. Mechanical pulp's share of total pulp production has declined slightly to about 37%. The mechanical pulping in Ontario is substantially of the stone ground variety rather than the chemi-mechanical.

Investment in Ontario newsprint capacity has not been stagnant. It has displayed a steady rate of expansion, with total growth of 23% over the thirteen year period. Because of current market conditions, the newsprint capacity figures collected during the CPPA's survey period (mid -1991) may well be adjusted downward before 1993 by plant closures and line shut-downs, that could take place in the medium term. Despite that, the province is still a significant producer of newsprint in North American markets.

As a result of these long-term investment trends in additional and remodeled capacity, Ontario's total volume of output in pulp and paper has undergone some modest changes in its overall structure. At the same time, some older and slower plants have been converted to non-newsprint products, some have been phased out and in others, machine speeds and paper quality have been upgraded to make them more competitive.

The most significant area of Ontario's capacity expansion has been among the Paper and Paper Board production facilities where the rate of growth has been double that of newsprint. Capacity has expanded by 870,000 tonnes compared to newsprint's 421,000 tonnes. By 1993, Ontario's Paper and Paper Board (non-building) capacity will have expanded its

Table 1.5

Medium-Term Capacity Changes in the Ontario Industry

	Ontario Capacity As % of Canada		Change 1990-93			
			Ontario		Rest of Canada	
	1980	1993	Tonnes	%	Tonnes	%
Newsprint	20.0	20.4	350	18.5	540	6.6
Other Paper & Board	36.3	30.3	162	6.2	936	17.1
Other Building Bd.	19.7	22.1	0	0.0	2	0.4
Total Paper & Board	**25.6**	**24.8**	**512**	**11.0**	**1,478**	**10.4**
					0	
Chemical Pulp	19.9	19.8	14	0.5	591	5.5
Mechnical Pulp	19.8	13.1	-114	-6.1	1,330	12.8
Other	39.0	18.8	9	6.6	10	1.6
Total Pulp	**20.0**	**16.6**	**-91**	**-1.9**	**1,931**	**8.9**

Source: Canadian Pulp and Paper Association (Ref #5)

share of the total volume of paper products (ex pulp) to 53.6% -- up from about 49% in 1980.

If medium and long-term sales of newsprint fall below trend, the ratio of Ontario newsprint capacity to other forms of paper products capacity may undergo a further reduction as the industry adjusts to higher levels of under-utilization.

The position of market pulp versus total pulp is also shown in *Table 1.4* In 1993, market pulp is expected to provide just over a quarter of the Ontario pulping capacity. At any one time, this proportion is affected by the demand for basic paper products: the lower the market demand for those end products, the more pulp capacity is freed up for open market sales.

Using the CPPA's 1991 survey of pulp and paper industry capacity as a guide, *Table 1.5* draws a comparison between the forecast capacity changes in Ontario and those in the rest of Canada from 1990 to 1993. It also shows Ontario's pulp and paper capacity as a percentage of Canada in 1980, and its forecast share in 1993.

Ontario's Near-Term Capacity Changes Are Different From Those of the Rest of Canada.

Ontario's future share of Canada's capacity in newsprint will apparently stay at about its historic level of 20%, although that may change if plants are decommissioned in Ontario and other parts of Eastern Canada in the near term. Ontario's rate of newsprint capacity expansion in the period 1990 - 1993 is forecast to be 350,000 metric tonnes, or 18.6%, compared to 540,000 tonnes, or 6.6% for the rest of Canada. For other paper and paperboard, the weighting is reversed - the rest of Canada increases by 17.2%, while Ontario increases by 6.2%.

By 1993, Ontario's facilities will increase their capacity to produce paper products of all kinds by about the same percentage as the rest of Canada -- the significant difference is in the balance between the various wood and paper products.

Ontario's pulping capacity is scheduled to decline slightly by 1993. This is in contrast to a substantial increase in the near term of 8.9% for the rest of Canada - including a 12.8% increase in mechanical pulping. These CPPA figures used here do not include recently announced expansions in the Prairies and B.C. which will add another 690,000 tons of kraft pulp capacity in the West. With these additions included, the rest of Canada's woodpulp capacity would rise by about 12%, rather than 8.9%, which compares to a drop of about 2% in Ontario.

This more recent history shows that investments in Ontario's industry have not moved in quite the same direction as other parts of Canada. While its historic dependence on newsprint has declined compared to other types of paper, the Ontario industry's medium-term expansion plans still emphasize newsprint while its woodpulp industry capacity has stopped growing.

Quebec And The Atlantic Have Changed Dramatically

The CPPA survey of the estimated capacity of pulp mills shows that, in the Atlantic Provinces and Quebec, the 1980's saw a sharp change of the composition of production capabilities as a result of new investments. *Table 1.6* shows the magnitude of these shifts. The paper and board sector in the two regions expanded capacity by 2,225,000 tons (94%) over the period, compared to the Ontario industry's 870,000 (46%).

The industry's expansion strategies in Quebec and the Atlantic *(Table 1.6)* have been different from those in Ontario in other ways: the balance between chemical and mechanical pulpwood facilities in those regions has been transformed steadily over time as the industry in Quebec in particular, has put more emphasis on TCMP pulping.

Competitive electricity costs in the region may well have assisted the introduction of newer pulping processes such as TCMP. Hydro Quebec's estimates of industrial costs of electricity in mid - 1991 show Montreal as an index of 100, Toronto as 134 and Vancouver 93. (Barrie McKenna, Globe and Mail, April 13th 1992). The Swedish strategy, which is dealt with briefly in a later chapter, has been to use the TCMP technology to overcome high wood costs and to meet stringent environmental abatement standards. There too, as in Quebec in recent times, the rising costs of electrical energy have presented problems for this particular technology. In Sweden the planned phase-out of relatively low-cost electrical power from nuclear sources has raised the horizon of future costs.

Table 1.6
Quebec and The Atlantic
Pulp and Paper and Allied Products Capacity
1980-93 (000's tonnes)

	Total Quebec & Atlantic		Change 1980 - 93		Composition	
			Tonnes	%	%	%
	1980	1993	1980-93	1980-93	1980	1993
PAPER AND BOARD						
Newsprint	5,793	6,252	459	7.9	67.6	55.9
Paper & Paper l	2,359	4,584	2,225	94.3	27.5	41.0
Building paper/	422	355	-67	-15.9	4.9	3.2
TOTAL PAPER	**8,574**	**11,191**	**2,617**	**30.5**	**100.0**	**100.0**
PULP						
Chemical	4,545	4,152	-393	-8.6	41.9	33.2
Mechanical	5,482	7,873	2,391	43.6	50.5	62.9
Other	821	483	-338	-41.2	7.6	3.9
TOTAL PULP	**10,848**	**12,508**	**1,660**	**15.3**	**100.0**	**100.0**
MARKET PULP		**2,663**				**21.3**

Source: Canadian Pulp & Paper Association (Ref #5)

The Quebec industry in 1980 had a ratio of mechanical pulp over chemical of 1:1.2; after thirteen years of investments the ratio has expanded to almost 2:1. Chemical pulp capacity has actually declined by close to 9%. At the same time, the province's total pulping capacity has expanded aggressively at a rate which is three times that of Ontario's.

The Industry In British Columbia Has Oriented Itself Towards A Different Product Mix From Those of Central and Eastern Canada

The development strategies of B.C. industry have their own stamp and have been characterized by expansion in virtually all areas of production except building board and specialty pulps. The rates of growth for newsprint and paper/paper board were much steeper than those in Eastern and Central Canada.

Since 1980 *(Table 1.7)* the tonnage of newsprint capacity has been expanded slightly more than paper and paperboard, and the rate of growth in mechanical pulping has been much more than that in chemical. The volume of pulp production in the province predominates over the tonnage of paper products produced. As a result, the proportion of pulp going to the open market as opposed to integrated pulp and paper operations is the highest of the three main producing regions .

British Columbia industry also shares with Ontario's the preference for chemical (kraft) pulping over mechanical.

Table 1.7
The Composition of
British Columbia's Pulp and Paper Production
('000's tonnes)

	1980	1993	Change		Composition 1980	Composition 1993
			Tonnes	%	%	%
PAPER AND BOARD						
Newsprint	1,352	2,107	755	55.8	59.5	57.9
Paper and Paper Board	851	1,474	623	73.2	37.4	40.5
Building Paper & Board	70	59	-11	-15.7	3.1	1.6
TOTAL PAPER	**2,273**	**3,640**	**1,367**	**60.1**	**100.0**	**100.0**
PULP						
Chemical	4,508	5,645	1,137	25.2	75.8	40.4
Mechanical	1,247	2,979	1,732	138.9	21.0	61.5
Other	195	142	-53	-27.2	3.3	-1.9
TOTAL PULP	**5,950**	**8,766**	**2,816**	**47.3**	**100.0**	**100.0**
MARKET PULP		4,933				**56.3**

Source: Canadian Pulp and Paper Association (Ref #5)

B.C. still has a very large chemical pulping sector, which is about a third larger than its mechanical facilities, although the ratio between the two types of production is narrowing with time as more plants use the mechanical processes.

The above review has outlined some major compositional shifts in the Canadian and provincial industries. The investment process in the industry has been active and continuous but its performance in Ontario is lagging that in other areas of the country. This in turn has had, and continues to have a cumulative impact on the shape of the Ontario industry.

There are other aspects of the Ontario pulp and paper industry which from an economic perspective, are of particular relevance to the process of evaluating the potential impacts and the cost-benefit trade-offs in environmental policies -- they concern the industry's role and weight in regional development. Some broad estimates can be made of the relative importance of the industry at the community level and at the regional level - particularly in Northern Ontario (i.e. the area North of the French River) where the degree of local economic dependence on the pulp and paper industry can be quite high. This issue is reviewed in the next chapter.

2. THE INDUSTRY'S ROLE IN ONTARIO'S REGIONAL ECONOMIC DEVELOPMENT

The pulp and paper industry is to be found in all five of Ontario's economic development regions. The economic influence of its $4 billion in annual revenue flows and the beneficial impact of its purchases of goods and services are distributed across the province. For many Northern communities it is the single most important source of employment and incomes. MISA regulations will apply to pulp and paper companies in thirteen Northern communities in nine of which the level of economic dependence on the industry is at least one job in five .

The assessment of the appropriate timing and level of environmental standards frequently has to include the effects on jobs and incomes. It may also require a consideration of ways to ensure equilibrium in local economic areas which are especially sensitive to sudden change. The significance of the pulp and paper industry to the stability of the regional and community economies of Ontario will therefore be an important part of any evaluation of the social impact of new environmental standards.

Pulp and Paper's Role In Community Development

Measures to generate effective regional economic development are notoriously elusive. Resource industries such as pulp and newsprint with an export focus -- whether to other parts of the country or to markets in other countries -- have a powerful impact on local area economic development. They funnel new cash flow into the community and thereby generate multiplier effects on demand, employment, savings and investment. They play a significant role in providing long-term underpinnings to local aggregate demand, upon which regional economies, with the support of other public and private sector investments, can diversify.

Success in community economic diversification through the expansion of local demand depends also on the stability of these cash flows and the size and specialization of the local markets they create. These local markets are generated by demand from four sectors: export customers, local consumers, businesses, and governments. Each additional firm which locates in a community through some "exogenous" economic influence (such as a growth in local exports) will add to the underpinnings of aggregate local demand in the community, and as it does so, it will increase the chances of greater diversification through the growth of the local market's size.

A stable economic pulse consisting of local demand and wages and salaries from exporting industries is therefore of

considerable importance to small regional economies, especially those with long-term problems in the generation of sufficient jobs for the local population.

The pulp and paper industry is in this latter category. Because of its scale, it needs markets outside of the community, and it therefore creates in the community incomes earned from sales to the larger North American economy. It is not dependent on the size of the local market but rather adds to it significantly by providing an income and demand base for local industries, and by purchasing supplies and services.

Income Generation And Stability In Export-Dependent Resource Communities

Structurally, many Northern and Eastern Ontario communities do not yet have a broad economic base with diversified exports and internally self-sufficient consumer and business product markets -- many commodities and products are imported, and where local markets do develop they are still dependent upon incomes which originate with demand in external markets. Government revenues raised from industries, residents and households in these communities also depend very heavily on income derived from external demand.

Wide swings in the income cycle of some resource industries and companies involve correspondingly wide swings in community incomes and aggregate demand. Any community's loss of economic sustaining power in times of recession is balanced to some extent by the "automatic expenditure stabilizers" of government (U.I.C., Family Benefits, Mothers' Allowances, other social security income, grants and transfer payments).

Private sector "income stabilizers" can also help to sustain some of the purchasing power of a local economy in economic downturns for a limited period of time. These involve the depletion of personal savings, and increases in personal and business debt.

The Industry in Northern Ontario

The economy of Northern Ontario has customarily been defined for Ontario Government planning economic and development purposes as the area of the province lying north of the French River. The federal government's census districts 591 and 592 cover approximately the same area but also include Parry Sound.

In 1991, according to Statistics Canada and the Ontario Ministry of Treasury and Economics (Ref # 23), the two census districts had a population of just over 822,000 and a labour force of approximately 377,000. Unemployment in 1991 averaged 11.2% compared to a provincial average of 9.6%. In North Eastern Ontario the rate was 12.3%; in North Western Ontario it was 8.9%.

Statistics Canada's Population Census in 1986 showed some 14,000 people in the Paper and Allied Industries in Northern Ontario. The Census of Manufactures showed less - about 12,000 jobs. These

two estimates range from 3% - 4% of the Northern Ontario labour force. To this number can be added approximately the same number of woods workers, plus other workers in related activities such as transportation which would place the sector at about 6% - 8% of the Northern Ontario labour force -- depending upon which survey is used.

The Paper and Allied Product sector is not an apparently large proportion of the Northern economy. On the other hand, it is an important contributor to the "network" of community economies which comprise the total Northern Ontario economy, and, as will be shown later, it is concentrated in certain communities.

Table 2.1 , which is drawn from the 1986 Census of Manufacturing, shows the distribution of employment, wages and salaries and value-added by five main regions of the province for Paper and Allied Industries. The Pulp and Paper sector (S.I.C. 271) covers close to 60% of the total industry activity defined by Statistics Canada as Paper and Allied Industries (S.I.C. 27). The data here relate only to manufacturing operations of companies and do not cover woods workers, distribution or head office and administrative staff.

The main employment impact of the industry is in Central Ontario where there are twice as many jobs as in the northern parts of the province, but the total value-added by the Northern Ontario segment of the industry, and the higher level of average wages, provide an indication of its capital intensiveness. The total value-added for all paper firms in Northern Ontario amounted to about $1.1 billion in 1986, while for the rest of the province, with more than twice as many production employees, it was about $1.7 billion.

Value-added per production employee in Paper and Allied industries was

Table 2.1
Employment, Wages & Value Added
Paper and Allied Industries
Ontario Regions 1986

Region	Production	Value Added		Wages and Salaries	
	Employment	$ million	Per Emp. $	$ million	Per Emp $
North East	3,657	379.3	103,719	129.7	35,466
North West	6,574	760.6	115,698	230.8	35,108
N. Ontario	**10,231**	**1,139.9**	111,416	**360.5**	**35,236**
East	3,336	323.7	97,032	103.8	31,115
Central	16,953	1,246.6	73,533	449.4	26,509
South West	1,262	69.7	55,230	31.6	25,040
Ontario	**31,782**	**2,780**	87,468	**945.3**	**29,743**

Source: Statistics Canada (Ref #24)

highest in North West Ontario at close to $116,000; followed by North East Ontario at $104,000 and lowest in South West Ontario at $55,000. *Table* 2.1 also shows the way in which these production values are reflected in average earnings per production employee. In 1986, these showed differences of $10,000 a year between the highest paying region (North East Ontario) and lowest (South West Ontario). The average earnings in the North were $5,000 - $6,000 or so above the provincial average for all paper products

Table 2.2

Ontario's Paper and Allied Products - Production Activities 1986

Wages, Employment and Value Added

		Pulp	Newsprint	Paper Board	Other Paper	Total
Wages Salaries	$Million	94.6	231.3	77.8	541.6	945.3
Value-Added	$Million	282.1	811.3	233.3	1453.2	2779.9
Employment	No.	2,728	6,406	2,349	20,299	31,782
V.A Per Job	$	103,409	126,647	99,319	71,590	87,468
Earnings/job	$	34,677	36,107	33,120	26,681	29,743

Source: Statistics Canada (Ref #24)

The Sub-Sectors of the Industry

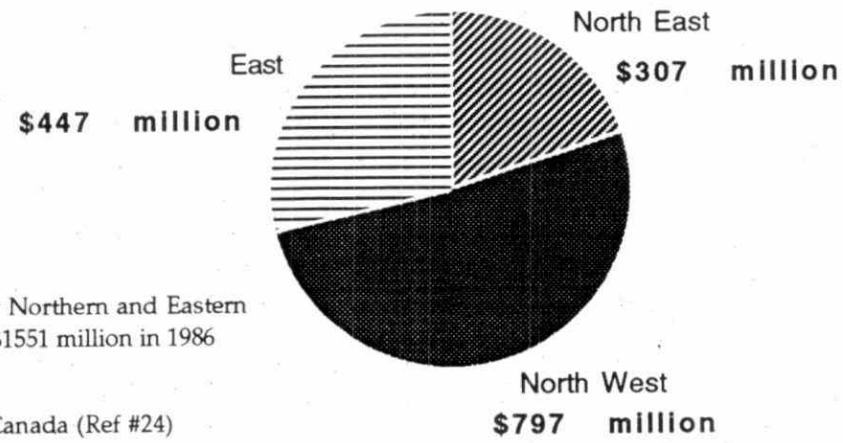
The three industrial sub-sectors of Pulp. Newsprint, Paper Board, and Other Paper Products constitute the "Pulp and Paper Industries" group which forms most of the "Paper and Allied Products" category. Census of Manufacturing figures on the economic performance of the paper industry by these three sub-sectors by region are not available. They are only available for the province as a whole.

Table 2.2 shows these sub-sectors for Ontario as a whole and demonstrates that the highest value-added and the highest average wage and salary earnings are in the pulp and newsprint sectors of the paper industry -- both of which are concentrated in Northern Ontario. The economic performance which emerges is clearly one of a relatively higher level of output and earnings per employee for pulp and newsprint compared to the average for other aspects of paper making.

Average annual wages and salaries (earnings) for production workers in Newsprint were some $7,000 more than in "other paper products"(Bags, boxes, writing paper, tissues etc). In Pulp they were about $6,000 higher. The value-added per job was also $30,000 - $55,000 higher for these two sectors compared to the "Other Paper" industry sectors.

Figure 3

Purchases of Supplies and Services By Pulp and Paper Industries Located In Ontario Regions



Total Purchases by Northern and Eastern Paper Firms of $1551 million in 1986

Source: Statistics Canada (Ref #24)

The Industry Buys Supplies and Services From the Regions In Which It Operates

The value of the paper industry's purchases of supplies and services exceeds that for direct wages and salaries. This is an important and frequently overlooked aspect of regional and community economic development: the growth of a local supplier base to a lead industry can be a powerful tool for sustained economic expansion.

In 1988, the gross revenue flows (using value of shipments as a proxy) into all Ontario pulp and newsprint companies alone is estimated by Statistics Canada to have been just over $3.0 billion. Of these purchases, $2.4 billion, or 78% was income from exports. Some 16%, or $490.6 million of the $3.0 billion in revenues, was disbursed as wages and salaries; and 37%, or $1.1 billion, was used to purchase materials and supplies for manufacturing operations, including goods for further processing and resale.

When these figures are broadened to include other Ontario paper industries, the total purchasing activities by all aspects of Ontario's paper industry in 1988 amounted to $4.1 billion. Other than wages and salaries, it is not possible to estimate what proportion of the business supplies and services were purchased locally, or even provincially, but presumably much of the total purchasing activity of the industry would be from other regional forest sector firms for roundwood, wood chips and pulp.

The year 1986 is the latest year for which statistics were collected on the regional activities of Paper and Allied industry companies. *Figure* 3 shows the pur-

chase of business supplies according to the location of the establishments in three key regional development areas of the province: North West, North East and East. While it cannot be assumed that all of the purchases were made "in region" the province-wide economic potential is clear in its magnitude. The companies located in these three regions purchased some $1,550 million of goods and services to keep their operations going. More than a billion dollars of that was reported by companies located in Northern Ontario.

This annual injection of wages, salaries and business purchases by newsprint and pulp operations represents a sizable stimulus to the province's regional economies with the highest levels of persistent unemployment. In Northern Ontario, the average unemployment was close to 10% in the period 1984-1991 compared to an average for Central Ontario of just over 6.5%. (Ref # 23).

The North and East Have High Levels of Demand Leakage To Other Regions and Other Countries

One of the continual challenges for regional economic development is that of maximizing the local impact of local expenditures and locally generated wages and salaries. Income and demand leakage's from Northern and Eastern Ontario to other parts of the provincial economy, and to other countries, are generally sufficient to push the multiplier effects below the province-wide average. (Ontario Ministry of Tourism and Recreation Ref #26). This means that the local spending multiplier for incomes generated by resource industries will not be as high as the province-wide income multiplier for say, the construction industry in the Toronto area (2.5-3.5 times new income), but nonetheless, the economic effect is significant and provides many local economies with a sustaining flow of incomes, expenditures and the savings for business investments in the community.

For example, in the tourism industry the multiplier tends to be relatively low in the North because of the high levels of imported products and services that the industry requires. Some estimates of North's community income multipliers produce a net additional income flow of only 51 cents for every new dollar of tourist expenditure. (Ref #26) On the other hand, construction, which is able to use high proportions of local materials and supplies, will have a different and probably higher local income multiplier -- again depending entirely upon the structure of the community economy, the projects that generate the income and the composition of personal, business and government demand.

For the pulp and paper industry's business purchases, the probability is that the multiplier will be high, sustained and stable, because the sources of its particular services and materials are usually close to hand. However, the leakages in aggregate demand as the income works its way through the local economy will usually be above the provincial average. This will occur because the economies of Northern Ontario and

Eastern Ontario do not have a comprehensive base of industries to supply consumer and business needs.

Single Industry Job Dependency In Pulp and Paper Communities in the North

A corollary of export-linked income generation is the single-industry town syndrome. The proposed MISA regulations relating to pulp and paper would apply to 27 plants which discharge directly into provincial surface waters. There are 10 plants which are not covered by the proposed regulation. Of the 27 plants which are to be covered by the MISA requirements, a large proportion is in Northern Ontario where the degree of community dependence on those plants for jobs varies, but is generally high. Some of the MISA-designated plants are in Southern Ontario but their share of the regional and local economies in which they are located is generally smaller. The analysis which follows is for the Northern Ontario plants affected by potential MISA regulations.

Precise data on the labour force and pulp and paper mill employment in smaller Ontario communities is difficult to acquire; but, it is possible to obtain a broad perspective on the community economic relevance of MISA-designated plants -- by using job and labour force estimates based on population counts for the pulp and paper communities and the areas around them.

Table 2.3 shows the estimated number of jobs involved in mills which are covered by the proposed MISA regulations for the Great Lakes. It shows that employment in relation to the estimated 1988 labour force for the area. These data have been derived from estimates made by the Ministry of Northern Development and the Ministry of Treasury (Refs # 1 and 24) which used a 46% average participation rate for the labour force (expressed as a percentage of population), and survey estimates of plant workers and company woods workers -- contract woods workers were not included. To determine the complete job dependency would require a more extensive examination of the local work forces involved.

Even with the data approximations, the role of pulp and paper mills in Northern Ontario's economy is marked by a high degree of concentration in a few communities. The figures show that in communities where there are MISA-designated plants the industry on average hires 11%-12% of the labour force. The deviations from this average are quite wide because of the weight of two relatively large urban areas with lower levels of job-dependence on pulp and paper: Sault Ste Marie (2%) and Thunder Bay (7%).

In Most Northern Pulp and Paper Communities A Quarter To A Third of the Labour Force Is Directly Employed by the Industry

If these two urban centres are excluded from the totals, the figures show a much higher level of job-dependence for the remaining communities. Excluding Thunder Bay from the figures for the

Table 2.3
Northern Ontario
Community Dependence on Pulp and Paper Industry
Companies Subject to MISA Regulations

Community (District)	Est. Labour Force	Company Jobs	Approx % Lab Force Affected	Companies Affected	Products
NORTH WEST					
Red Rock	1,650	700	43	Domtar	Newsprint/linerboard
Terrace Bay	2,350	730	31	Kimberly-Clark	Pulp
Dryden	3,400	1,100	32	C.P. Forest Products	Pulp, fine paper
Marathon	1,900	412	22	James Riv-Marathon	Pulp
Fort Frances	3,100	880	28	Boise Cascade	Pulp, specialty paper
Kenora	5,500	787	14	Boise Cascade	Newsprint
Thunder Bay	50,300	3,510	7	Abitibi; C.P. Forest; Provincial Paper	Fine papers, newsprint and pulp
PAPER COMMUNITIES	68,200	8,119	12		
TOTAL N.W.	117,000		7		
NORTH EAST					
Espanola	2,660	1,514	57	E B Eddy	Pulp
Iroquois Falls	2,700	1,162	43	Abitibi-Price	Newsprint
Kapuskasing	4,980	1,600	32	Spruce Falls	Newsprint
Smooth Rock	940	290	31	Malette	Pulp
Sturgeon Falls	2,960	310	10	MacMillan-Bloedel	Currugated Board
Sault Ste. Marie	36,140	510	2	St. Mary's Paper	Specialty papers
PAPER COMMUNITIES	50,380	5,386	11		
TOTAL N.E.	255,000		2		

Source: Ministry of Northern Development, Treasury (Refs #1 & 23)

North West, the communities with industries subject to MISA regulations have 26% of their labour force in pulp and paper. Excluding the Sault raises the average for the North East from 12% to 34%. These are high levels of linkage to single industries, and frequently single plants, which pose particular challenges in the design of implementation strategies and regulatory programs for MISA.

MISA's potential economic impact is greater in North West Ontario where about 7% of the labour force (8,000 people) work in plants designated for regulation. In the North East the overall area of potential impact is much smaller - some 2% of the work force or about 5400 employees. In both regions there is a relatively small number of affected communities each of which depends heavily on the pulp and paper industry for its livelihood.

For Northern communities, where historical unemployment rates have tended to be above the provincial average, a 10% dependency on one industry leaves the local economy vulnerable to a doubling of the long-term jobless rate if that industry fails. A slow-down or prolonged stagnation can also have serious economic effects, especially if the population is growing.

The factors determining the multiplier and disinflationary effects of local income changes are, as discussed above, imprecisely known, but their effects are probably more severe in communities where local sourcing for supplies and services by the largest employer is well entrenched and pronounced. The impact of a mill closure, or a slow-down in its rate of growth, will usually extend to other communities if they are within the local purchasing radius of the company -- e.g. the demand for wood chips, roundwood, maintenance services and supplies and so on will be curtailed.

MISA regulations will apply to pulp and paper mills in 13 Northern Ontario communities. In nine of those communities, the level of job-dependence is one job in five, or more. In seven communities it is one job in three, or more The job dependency levels in Espanola, at 57%, appear to be higher than elsewhere. The statistical significance of the difference between that figure and the 43% for Red Rock and Iroquois Falls is not ascertainable because of the approximation of some aspects of the data; but, the broad indications provided by these measurements strongly suggest that community economic and job-dependence is a factor of some weight to be acknowledged in the implementation of MISA regulations.

This single-industry syndrome creates a particularly heavy societal burden if the costs of regulatory measures reduce the competitiveness of the industry and hence the cash flows into community economic structure. On the other hand, if investment measures for environmental purposes also have a positive effect on productivity, and hence on competitiveness, the economic and social benefits are correspondingly amplified because of their focused contribution to regional development in areas where the level of structural unemployment has been historically above average and difficult to reduce.

Are There Implications for Environmental Programs?

Where a quarter to a third of a community's jobs depend upon the efficiency and effectiveness of large-scale capital investments in the principal industry of the local economy, environmental concerns quickly come face to face with those of international competitiveness. The implication is, that for environmental regulators, a knowledge of certain economic factors regarding the operations of individual plants and companies can be helpful in setting environmental standards, and, in negotiating deadlines for the implementation of those standards. A regulatory implementation strategy which is obliged to be sensitive to the economic impact of the costs of new environmental standards, will need to be alert to their sig-

nificance in a number of areas of plant operations.

Knowledge of these key economic and business parameters would assist public policy in meeting its need to minimize, wherever possible, disruptions to growth and employment, while at the same time, pursuing environmental quality and encouraging investment in competitive efficiency. The key parameters to assist the negotiation of regulatory standards might therefore include information on the following:

- any planned down-sizing in the plant's direct employment, or, in its local purchasing policies.
- the general state of the plant's technology and equipment;
- the relative competitiveness of the plant in key product markets;
- the plant's expected market performance over the next stage of the business cycle;
- the history and near-term outlook for the company's cash flow cycles;
- the optimum timing for any new investments by the company; and
- the regional purchasing policies of the plant and their impact on regional and community employment.

Without knowledge of these types of operating factors, it will be difficult to ascertain what economic impact any environmental standard might have on a firm, a plant, or a community, and what measures might be taken to arrange for appropriate transition periods, and/or the support of other government programs designed to assist employees and plants in the restructuring process.

3. THE INTERNATIONAL COMPETITIVE ENVIRONMENT

Ontario newsprint mills suffer from a technology lag; they are on average less efficient and more exposed to closure than those in the U.S. and B.C. In recent times, the Canadian newsprint industry has experienced lower levels of capacity utilization than the U.S. industry. The U.S. South and North Central regions are emerging as strong market contenders on a wide range of products, especially recycled newsprint and pulp. Comparatively, producers in Sweden, Finland and the U.S appear to place more emphasis on technological change as part of their fibre strategies than those in Ontario. There is some possibility that demand for recycled paper materials will exceed available local supply in Ontario and Quebec in the mid-1990's . Ontario's older newsprint mills will be hurt by this trend and by the growth of newer and more modern industry capacity in other parts of North America.

Productivity, Technology and the Industry's Competitiveness

The pulp and paper industry in Ontario and Canada has been criticized in various studies and reports for its lack of modernity, a conservative approach to research and development, and, a reluctance to innovate and use new technology in product areas where there is the maximum possible economic activity for generated Ontario -- in the form of value added, (or alternatively, Gross Domestic Product,) per unit of wood taken from the forest. *(Woodbridge Reed, Oum & Tretheway, H.A.Simons, Hayter, Ref Nos 9, 10,11,28,29,31).*

These evaluations apply in the general case rather than the specific because examples of innovative management strategies which do not conform to the conservative pattern have occurred in Ontario and elsewhere. The structure of the industry is an interesting point to begin a review of these issues, since size, scale and concentration are frequently of benefit in the mobilization of the resources necessary to keep apace of global technological innovation.

The Porter Report (Ref #29) observes that:

"Currently, the newsprint industry is highly concentrated, with seven companies controlling approximately 65 percent of Canadian capacity: Canadian Pacific Forest Products, Abitibi-Price, Fletcher-Challenge Canada, Stone Consolidated, Quebec and Ontario Paper Company, Kruger and MacMillan Bloedel. These companies are generally large, integrated pulp and paper companies. Fletcher Challenge and

Table 3.1
The Global Ranking of Ontario-Based Companies

Company	Pulp and Paper Sales $ mil	Ranking	Consolidated Sales $ mil	Ranking	Consolidated Income $ mil	No of Employees	No of Countries
Kimberly-Clark	6,210	4	6,407	6	432	39,954	18
Noranda	2,180	19	3,904	18	-81	24,000	2
C.P.F.P.	1,638	34	1,983	39	-8	14,500	2
MacMillan-B	1,357	42	2,574	32	178	15,036	2
Abitibi-Price	1,262	47	2,647	43	59	na	2
Eddy Paper	404	101	452	107	na	2800	2
Quebec & Ontario	342	113	354	119	17	2716	1

Source: IPP (Ref #34)

MacMillan Bloedel dominate Western Canada and tend to employ newer, larger machines than their Eastern counterparts. Canfor and Abitibi-Price dominate the much larger Eastern industry which represents approximately 79 percent of industry capacity."

The IPP *(Ref No 34)* reviewed the 1990 rankings of the top one hundred and fifty pulp and paper producers around the world in terms of sales revenue from pulp and paper products. The results, in U.S. dollars for the Ontario - based companies in that listing are shown in *Table 3.1* The scale and ranking of the top five Ontario companies is of some significance. While none of them is the largest in the world, most of them are in the top fifty percent, and they all operate in more than one country. One operates in 18 countries.

In research and development, size is an advantage which provides economies of scale and scope and efficient networking of knowledge. It facilitates the ability to specialize and enter into strategic alliances with other corporations. The international flow and transfer of research and development (R&D) and the leading role of multinationals in those processes are well documented. The resources of a multi-national corporate vehicle usually give management easier access to the tools and benefits of research and development.

The organizational potential for a high level of research and development with strong innovative thrusts is manifestly present in the Canadian industry; but, the performance does not match the apparent potential. The Porter Report notes of the Canadian situation:

"There is a tradition of firms cooperating with one another on technical matters. While this technical cooperation is at the pre-competitive stage, the mindset seems to affect the industry's general approach to technology and innovation. .....The Canadian attitude has contributed to a slower rate of domestic innovation than in other nations where individual firms often compete

with one another for cost advantage based on productivity and technology." (Ref #29)

Statistics Canada *(Ref #44)* in a 1984 survey of the industrial uses of technology by Canadian-based industry provides expenditure data for the industry on R&D. *Table 3.2* summarizes those findings for the Canadian pulp and paper sector and calculates R&D as a percentage of Shipments -- which serve as a proxy for sales. The level of R&D spending oscillates between 0.3 and 0.4% of shipments. For the size of the industry this percentage is relatively small -- in 1988 the industry (broadly defined) made shipments worth $25.7 billion. Canadian control did not seem to affect the results significantly for the industry: the ratio moved up to 0.4%.

Table 3.2
In-House R&D Expenditures
Canadian Pulp & Paper Industry
1984 ($ million)

Year	R&D	Shipments	R&D as % Shipments
1980	52	14,503	0.36
1981	68	15,729	0.43
1982	62	14,261	0.43
1983	56	15,011	0.37
1984	64	17,472	0.37
1985	75	18,075	0.41
1986	87	20,067	0.43
1987	85	23,012	0.37
1988	89	25,661	0.35

Source Statsitics Canada (Ref#'s 24 and44)

The Results of A Low Priority for Research and Development.

The R&D performance of the sector is well below the general levels for technologically innovative manufacturing industries. The figures compare unfavourably, for example, with the average for all business of 2.6% in the U.S. and 1.2% in Canada. For Telecommunications equipment in Canada the ratio was 13.4%, for Electronic Parts it was 4.9%., for Aircraft and Parts it was 10.1%.

The H.A. Simons Report, and Porter *(Ref #'s 28 and 29)* make reference to the inefficient size and obsolescence of many paper mills. The former expresses the view that up to half of Ontario's newsprint mills could be forced to close because of outdated technology. The industry's decisions will inevitably have to be directed to the matter of restructuring and also to that of labour productivity. This may well affect jobs, incomes and community development. The Porter study notes:

"In 1989, operating labour hours per finished tonne averaged 3.8 in Canada, versus 2.6 in the U.S. South, 2.1 in Finland and Sweden, and 1.8 in the U.S. West.....While Canadian productivity (hours worked per finished tonne) improved about ten per cent from 1985 to 1989, it is still less than half the productivity level seen in the U.S. West, and two-thirds of the level of the U.S. South. Currently, high labour costs represent the largest single cost disadvantage for Canadian producers and reflect the slow pace of overall upgrading throughout the industry."

The profound restructuring of the industry which such a conclusion suggests, will come at a time when the in-

dustry will be obliged to make choices and decisions concerning the environment and competitiveness, both of which will require additional investment and operating funds. This is not to suggest that the achievement of competitiveness and sound environmental practices are incompatible, (since the Swedish and U.S. experience would suggest otherwise) but rather to point out the need to ensure the continuous harmonization of private and public sector decisions in what could be a difficult decade of transition ahead.

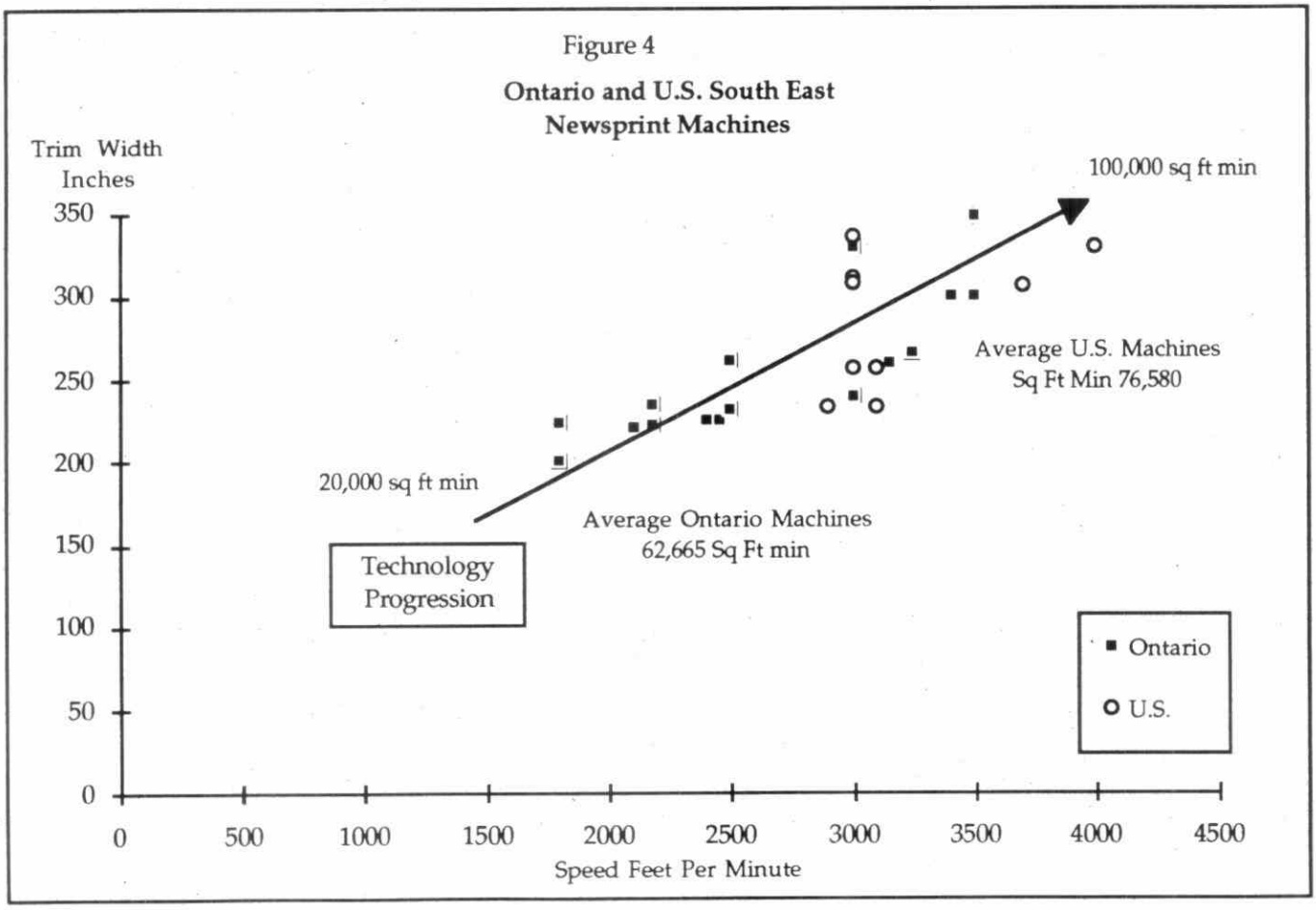
To provide a broad perspective on this issue, a comparison was made between newsprint mill sizes in Ontario, Quebec, B.C. and the South Eastern United States. Using Lockwoods *(Ref #27)* the trim width, and machine speed in feet per minute of each newsprint machine in these jurisdictions was plotted to show the comparative position of the Ontario mills.

Comparative Machine Speed and Sizes Of Ontario and Other Newsprint Producers

The results support the thesis that the need for more modern plant is becoming a hindrance to the international competitiveness of many Ontario and Quebec mills. *Figure 4* shows the array of the 18 operating Ontario newsprint

Figure 4

Ontario and U.S. South East Newsprint Machines



machines, versus the nine in the key producing states of the U.S. South East. The slope of the "technology progression" is towards bigger (wider) and faster machines.

Many of the narrower, slower Ontario machines have been adapted and speeded up in the past and have incorporated new features to improve their efficiency. The Ontario cluster is spread along a wide range of speeds from 1500 feet per minute to 3000. However, most of the province's machines are less than 220 inches in trim width. This adaptive approach to technology, especially when unsupported by substantial levels of research and development, has limits: at some point, a fundamental transition has to be made to larger, faster and more efficient newsprint machines in order to compete effectively with those in other locations.

Table 3.3
Machine Performance
Newsprint Industry

	Average Speed	Size	Weighted Output	Index
Ontario	2,762	264	62,665	100
Quebec	2,492	228	55,067	88
B.C.	2,983	255	66,157	106
U.S. South East	3,200	285	76,581	122

Source: Data from Lockwoods (Ref #27)

About half the Ontario machines are either on the competitive borderline or in the upper range of speed and size which match those of the U.S. but, the large number concentrated in the "non-competitive" technological range with slower speeds and narrow widths, is cause for concern. The U.S. machines in the South Eastern States, are newer, more efficient, and depending upon a variety of cost factors, potentially much more competitive. They begin at speeds of about 3000 feet per minute with a width of 225 inches.

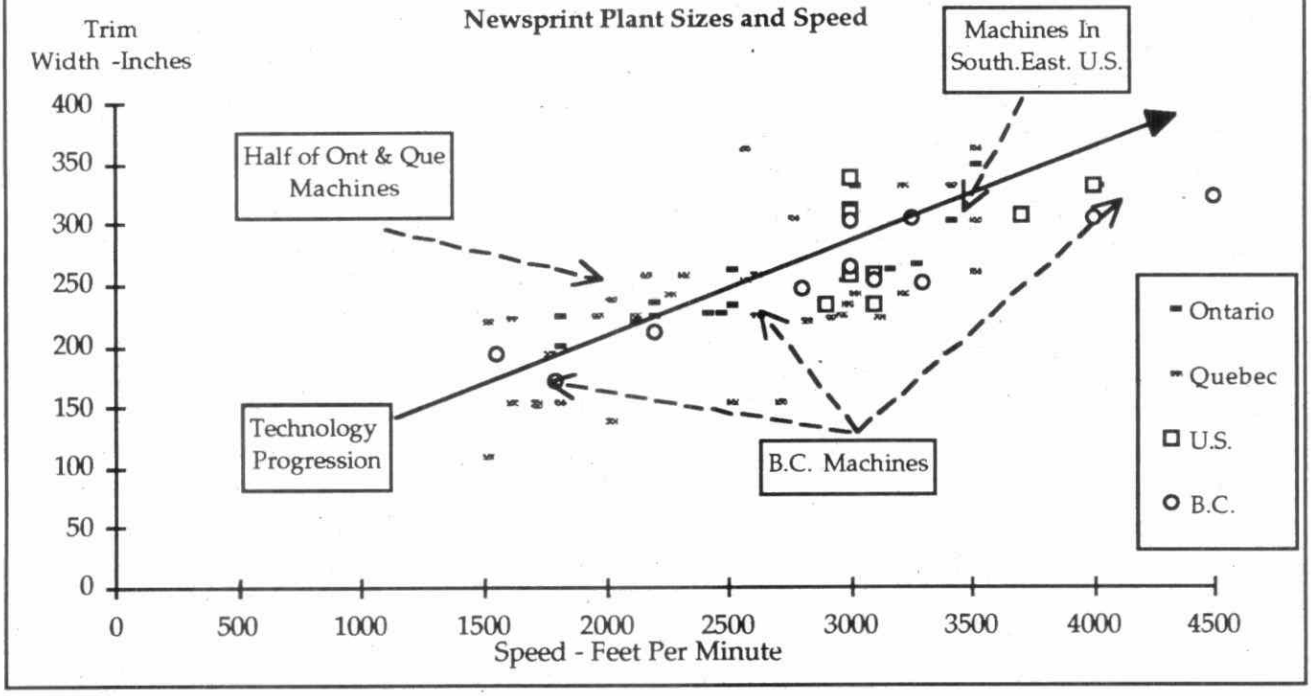
The average output per minute, (width times speed) is 76,600 square feet per minute for the machines in the U.S. South East compared to 62,700 square feet per minute for those in Ontario mills. The advantage to the U.S. side, on machine productivity alone, amounts to a lead of 22 percent.

Figure 5 adds the forty Quebec newsprint machines and the twelve in B.C. to this data to show the comparative distribution of machine performance. Quebec's problem is similar to Ontario's: a large cluster of older, smaller machines, mixed with a smaller number of modern, large, efficient machines. British Columbia has a wide spread of machine sizes and a scattering of low-end performers but, is relatively better off in the average performance than Ontario or Quebec.

Table 3.3 provides an index of the relative productivity of the newsprint industry in the four jurisdictions. It takes the weighted average output (square feet per minute) of the machines in each region, and uses Ontario as a baseline of 100. The output lead of the American machines is about 22% over those of Ontario, while Quebec has even more serious problems than Ontario with a weighted average output per machine per minute which is 12 percentage points less than Ontario's.

Figure 5

Ontario/Quebec/B.C./U.S
Newsprint Plant Sizes and Speed



Given that Ontario's main newsprint market is in the U.S. where newsprint capacity is still growing, the commanding position of the U.S mills probably means continuing competitive problems for the province's industry.

Ontario's two largest mills are at or close to world scale, but they are the exception - the majority are below it, and some to a significant degree. About half of Ontario's 18 mills are at or below the mid-range area of 60,000 square feet of newsprint a minute -- which can be used as a rough "competitive threshold" separating the older machines from those which are of more recent design.

In Quebec, the number of obsolescent machines is higher: about 70% (28 machines out of 40) are at or below the competitive threshold. It is quite likely that economic restructuring of the industry in that province will cut more deeply than in Ontario.

The Relative Position of the Ontario Industry

Despite the fact that it is one of the world's largest exporters and a capital-intensive industry, Canada and Ontario's pulp and paper sector is not regarded as a world technological leader and innovator. *(Woodbridge Reed, Price Waterhouse, Oum and Tretheway Refs # 8,9,10)* While in many areas the Ontario industry has invested aggressively and restructured, in many mills the pace of change has not kept up with the world's best plants. It is therefore difficult to characterize it as

uniformly a leader in its approach to technology.

The Industry's Competitive Ranking Is Not High

The newsprint industry in Ontario does not sit highest on the ranking of competitive positions; nor is its plant the lowest in the economics of scale. The data above and the studies quoted suggest that over most, although not all of its structure, it is in less than a "state of the art" condition. From the review of its main characteristics in the earlier chapters and sections, a simple schematic of the kind provided in *Figure 6* places it in juxtaposition to its main competitors in North America and to the world technological standard-setters: Sweden and Finland. It is ahead of Quebec in some respects (in the adoption of CTMP it is behind Quebec) -- which is a large, high-volume competitor -- but well behind the more technologically advanced systems in B.C., the U.S. and Scandinavia.

Value-Added Is A Useful But Illusive Concept.

Value-added is a frequently quoted measure of the technological and economic sophistication of an industry. It is one measure of net economic activity generated by an industry -- after deducting its purchases of goods and services from other industries or sectors of the economy. It can be useful as an indicator of the success of a resource management policy, and of industry's effective use of knowledge skills when it measures the net new economic activity created for each unit of a resource processed by an industry. An example would be G.N.P. per cubic meter of wood taken from the forest. These data do not exist on a regular or systematic basis for the Ontario forest industries. It is therefore not possible to measure accurately and compare the "value-added" performance of Ontario's pulp and paper industries against those of other jurisdictions.

Value-added per unit of resource is difficult to measure without special surveys of the inter-sectoral and inter-provincial flows of goods and services. For example, a log cut in British Columbia might be turned into pulp in that province, brought to Ontario where it is transformed into computer paper, and then sent to a factory in Quebec where it is packed and distributed in the United States. A log cut in Ontario might pass through several industries before emerging as a final product, each time creating a net cumulative addition to the provincial value-added.

An industry which generates high levels of gross value-added can nonetheless be inefficient in its use of a scarce resource - either human or natural, especially if the resource is under-priced by international standards. The production data which do exist do not permit a reliable examination of the efficient use of resources from the value-added perspective. They do permit an approximate comparison of economic effort with the use of aggregate industry data on sales and purchases of goods and services. They are drawn from Statistics Canada's

Census of Manufactures, (see Chapter 2 of this report). They show the value of output, minus the cost of purchased goods and services. What they do provide therefore is a measure of the total net new incomes generated by the industry (wages, profits, depreciation) rather than the economic benefits per unit of forest resources consumed or depleted.

Product Life Cycles and Value Added.

In much of the literature concerning value-added and technology there is a matching concern for "product life-cycles." At any one time, the economy contains products whose age since their introduction into the market place varies widely: e.g. lumber, newsprint, liner board, computer paper, office copier paper, and colour-printing papers.

When a product is first introduced, the "value-added" per unit of output is usually high because of the monopoly prices that can be asked for the product by the innovating company. Typically, output at this stage is not of a high volume and competition is weak, but as new markets are developed demand grows rapidly and the number of competing companies increases. As products "mature" in age, the knowledge and skills required to produce them become more widespread, competition grows, real prices stabilize or fall (e.g. computers, consumer electronics and software) , mass markets are developed and profit margins per unit are reduced.

As the product "ages" further, competition from other materials intensifies, markets are saturated and industry growth then depends upon population expansion and the growth of *per capita* consumption of the product. At this advanced point in its age cycle, a product can be vulnerable to replacement and substitution by other products, but research and development into improved product quality can also extend the product's life cycle. An example would be the development by Swedish pulp and paper companies of high-quality, lighter, stronger newsprint to compete in an otherwise saturated market. The best-positioned pulp and paper companies, will be those that prevent their products from "aging" and, that are able to maximize the economic return (incomes and earnings) per unit of wood or fibre they purchase and per-unit of labour they hire.

High raw fibre costs (e.g. Scandinavia) have generally pushed industry towards more advanced forms of high-yield pulping, while wood scarcity has encouraged careful forest conservation, uses of alternative woods, and improved harvesting technology.

Where wood costs are low, where wood supply and the growing area are plentiful, where energy costs are low, and where water is plentiful and cheap, (Ontario and Quebec) the economic incentives for business and the land owner to turn to science and technology for solutions are correspondingly diminished.

Commodities Versus High-End Value-Added Products

Figure 6 also shows two dimensions of a fibre strategy: Value-Added and Productivity. The commodity route (the Y axis in Figure 6) is a typical route among the Canadian provinces: that is, the application of capital to extensive, low-cost forest reserves, and, mass production of a relatively lower value-added product such as lumber, newsprint and pulp. These are generally characterized as products that are at an advanced age on the typical product life-cycle. While Ontario's pulp and paper industries have a relatively high level of value-added compared to other manufacturing industries, in fact, it is unlikely that they are at the leading edge -- either in terms of the efficiency with which wood is used, or, in terms of the total economic activity generated for each tree cut down. More research would be necessary to examine this point with greater precision, but, the issue is of some significance to government policies aimed at sustainability of the resource base.

High-quality, standard-setting products such as Scandinavian newsprint, attempt to combine a commodity strategy with a maximum value-added strategy. The Finnish strategy, which is slightly different, has been to enrich the economic benefits of the forest resource by focusing on new kinds of finished product so as to stay competitive, and to get the optimum industrial and financial benefit out of every tree.

Product Innovation In North American Markets

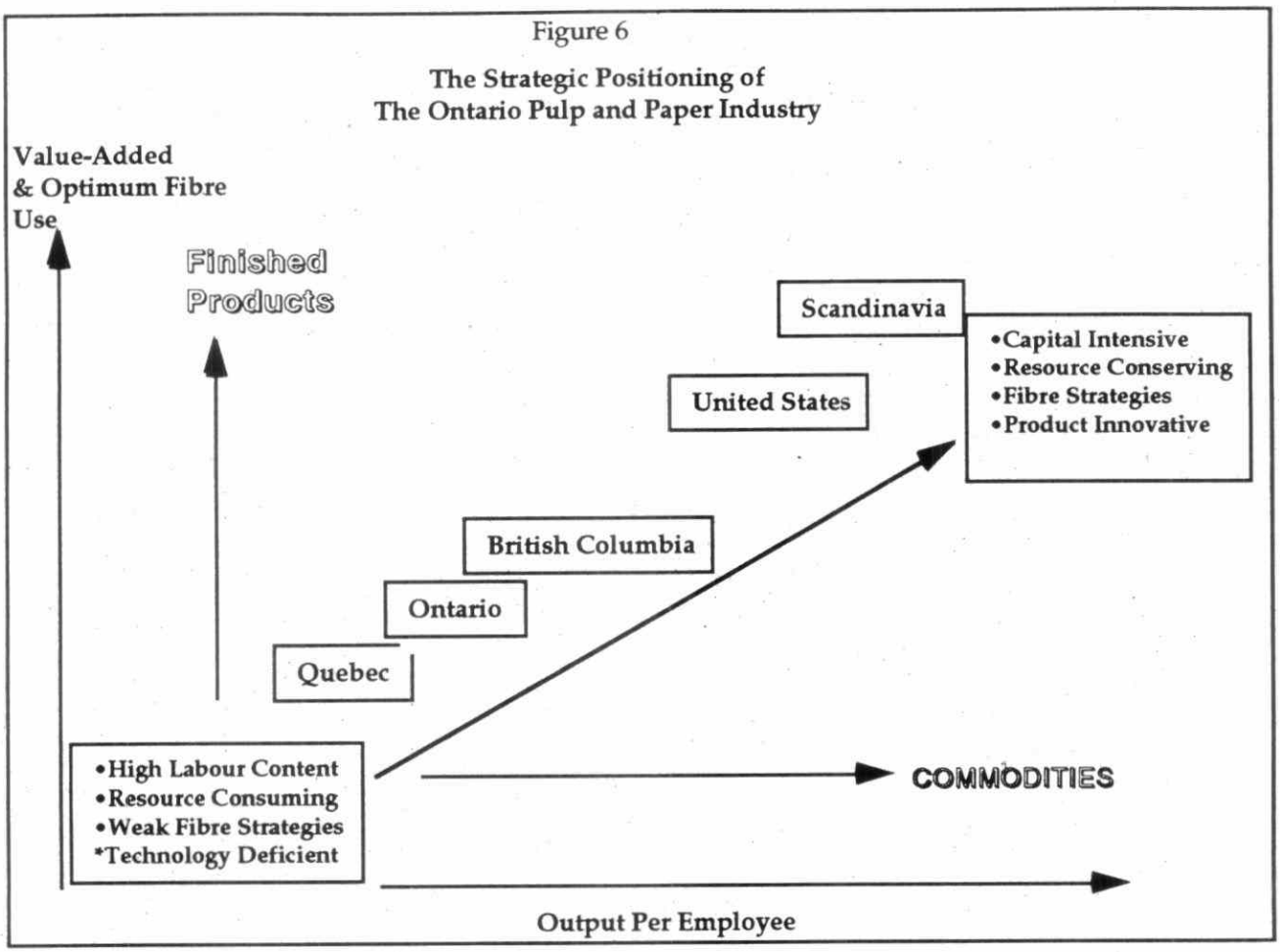
The U.S. industry has most of the North American production capacity in finished paper products and pulp. The demands of customers have made innovation in quality and strength a primary requirement for survival in this market segment. The US industry, while moving progressively and more forcefully into its own newsprint markets, has left the bulk of the commodity production focus to Canada, preferring to concentrate on more valuable and innovative paper and paperboard products.

While the Ontario industry has diversified its products over time to extend the range beyond newsprint, the industry cannot be typified as product-innovative in the sense that the U.S. or Scandinavian industries set standards, design, adapt and try out new products. The slender hold on U.S. non-newsprint paper markets by Ontario producers is evidence both of U.S. technical superiority and of the reluctance of Ontario producers to undertake the technological and market risks involved.

Adequate market size and market share are required for the effective use of economies of scale and for the realization of the full benefits of investment in technology. The next section examines that issue and the positioning of Ontario industry versus its competitors.

Figure 6

The Strategic Positioning of The Ontario Pulp and Paper Industry



The Ontario Industry And Its Market Place Competitors

The largest single shared market for Canadian producers is the United States. In 1990 the United States consumed some 12.2 million metric tons of newsprint. Just under 53% of U.S. newsprint demand was met by Canadian mills. Of 9.1 million metric tonnes produced in Canada, 6.4 million, were sold to U.S. customers. Other producers around the world, while providing price and quality competition at the margins of the market, were not a significant force in the overall play of the market. They shipped only 0.2 million metric tonnes into the United States.

Depending upon factor costs and exchange rates the pressure of Canadian newsprint supply on U.S. market prices at any one time can be significant and commanding. However, the cost structures of the Canadian industry vary from province to province, from company to company, and from plant to plant. This will affect the ability of some producers to pass along higher costs, and/or to ride out recessionary cycles.

Ontario's Share of the U.S. Newsprint Market Is Significant But Not Commanding

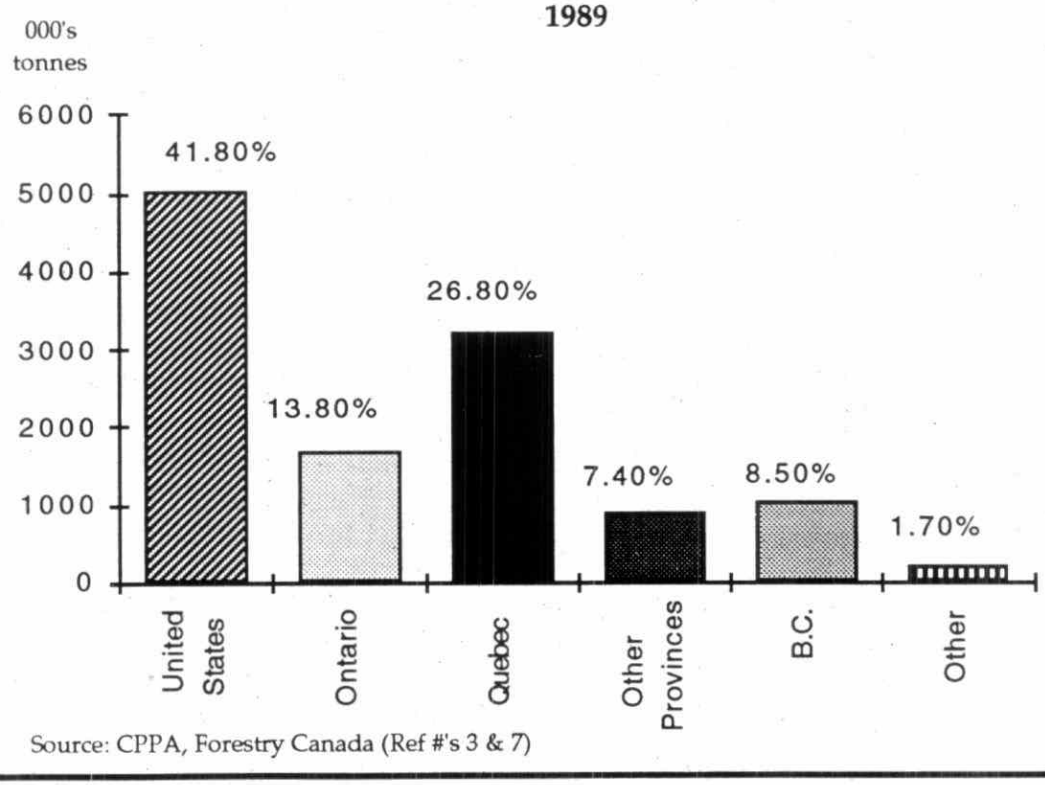
The production of goods to meet the needs of the United States market at acceptable prices and quality is a primary objective of the Ontario industry. It faces strong competition. In the case of newsprint, the Ontario share is close to 14% of U.S. demand *(Figure 7)* Other provinces, competing in the same market have a larger share - some 43%. In addition, the U.S. industry itself occupies about 41% of the market place. Other off-shore producers, such as Sweden and Finland, at less than 2% of the market share do not have a large or secure position.

The industry's share of the U.S. market for virgin product in the near term is subject to challenge. The build-up of newsprint capacity in recent times in Ontario, Quebec and the U.S., is closely tied to secondary fibre markets and has some special offsetting features including shut-downs and conversions of existing pulp and newsprint mills. The industry in other provinces appears to have vigorous medium-term investment programs in pulp and non-newsprint papers and paper boards (See *Table 1.6*) -- although the markets for these products in the U.S. are not nearly as well penetrated by Canadian manufacturers as those for newsprint.

Canada's weight in United States wood-

Figure No. 7

U.S. Newsprint Market Shares
1989



Source: CPPA, Forestry Canada (Ref #'s 3 & 7)

pulp markets is less than it is in newsprint, but it is still the main source of that country's woodpulp imports. United States consumption of pulp in 1990 was 57.2 million metric tons of which only 4.4 million metric tons, or 7% was imported. *(CPPA and Forestry Canada Ref #3 & #5)* Of the U.S. imports, 88%, or 3.8 million metric tons, came from Canada.

Ontario Is Not A Dominant Player in North American Markets for Pulp and Non-Newsprint Paper Products.

Ontario ships approximately a quarter of its tonnage of market pulp to the United States, but meets only about 2% of total U.S. consumption. Ontario mills are much more significant players in the Canadian market where they make about 26% of all market pulp shipments. About two-thirds of the Ontario woodpulp production is not in the market pulp category and is integrated directly into the industry's paper products operations within the province.

The importance of North American markets for Canadian producers is also evident in the shipments of paper products other than newsprint. The total volume of these products shipped in 1990 by Canadian plants -- according to the CPPA (Ref #7) -- was 7.4 million metric tons. Of this, 3.4 million metric tonnes, was exported; and more than three-quarters of the exports (2.6 million metric tons) went to the United States. At 2.6 million metric tons, however, those Canadian exports were a fractional share of the U.S. non-newsprint paper products market -- U.S. domestic production dwarfs Canadian exports and amounts to more than 64 million metric tons a year. Canadian imports of non-newsprint paper and paperboard products in 1990 were close to 1.1 million metric tonnes.

In 1989, Ontario exported some 774,000 tonnes of non-newsprint paper products to the United States - roughly a third of its volume of output. Ontario's U.S. market share in these products was only 1.2%.

Two issues arise from these small shares which Canadian companies have in the U.S. non-newsprint markets: first, it could well indicate the presence of an opportunity for long-term expansion in these large continental markets in end-products such as computer papers and fine papers; and second, it is improbable that Canadian and/or Ontario producers exert any significant leverage on U.S. market prices for non-newsprint products. Because of their significant hold on Canadian markets, domestic producers would have relatively more influence on prices in the home market.

Off-Shore Competition In U.S. Pulp and Paper Product Markets Does Not Appear to Be Significant

The North American market has regional contours which are shaped by political jurisdiction, transportation costs, production costs, pricing strategies, and, competition from U.S. producers and, to a lesser degree, off-shore producers in Europe, Scandinavia and the developing countries. The off-shore competitive forces are more likely to have the

Table 3.4
Ontario, Quebec & B.C.
Pulp & Paper Output - 1987

	Tonnes	Value Added	
	000's	Total	Per Emp
		$ bil	$ 000's
Quebec	14,000	2.4	88.7
B.C.	9,785	2.8	151.2
Ontario	8,507	2.1	105.2

Source: Forestry Canada, CPPA (Ref #3)

effect of setting limits to the U.S. pricing - rather than operating as core forces in its determination. Canadian producers and U.S. producers occupy and run the main competitive networks in the North American market. The prevailing forces of newsprint supply and pricing in response to demand are determined by the regions of Canada competing with one another, and, with other regions in the United States.

As Ontario's closest geographic competitor for the U.S. South, Northeast and North Central markets, Quebec shares the transportation proximity to the major U.S. consumers. This factor, plus the size of its newsprint sector make it a serious contender in Ontario's major paper market -- although the earlier sections on size and scale show that its strengths are not unlimited. Quebec has the largest volume of combined pulp and paper output of any Canadian province: in 1987, its shipments were worth $5.7 billion, compared to British Columbia's $4.7 billion and Ontario's $4.2 billion. In volume terms, this 1987 output translated into thousands of metric tonnes is shown in *Table 3.4*

In value-added, the three provinces emerge differently, with British Columbia's pulp and paper industry clearly in the lead in terms of total value added and value added per employee.

Newsprint Production Has Lost Production Share In Both Provinces

An example of the long-term change in production capability for Ontario and

Table 3.5
Volume of Production 1950 - 1989
Ontario and Quebec
000's of Tonnes

	QUEBEC		ONTARIO	
Year	Newsprint	As % of All Paper and Boards	Newsprint	As % of All Paper and Boards
1950	2,510	83.4	1,125	65.1
1960	2,863	80.8	1,459	63.1
1970	3,766	74.3	1,686	58.5
1980	3,921	67.5	1,756	49.9
1989	4,321	63.3	1,871	43.8

Source: Forestry Canada (Ref #3)

Table 3.6
Quebec's Markets

	Canada	U.S.	Other	Total
WOOD PULP				
1980 - 000's tonnes	543	442	238	1,223
1989 - 000's tonnes	644	411	434	1,489
1980 - %	44.4	36.1	19.5	100.0
1989 - %	43.3	27.6	29.1	100.0
NEWSPRINT				
1980- 000's tonnes	523	2,793	585	3,901
1989- 000's tonnes	650	3,222	465	4,337
1980-%	13.4	71.6	15.0	100.0
1989-%	15.0	74.3	10.7	100.0
OTHER PAPER AND PAPER BOARD				
1980- 000's tonnes	1,401	374	117	1,892
1989- 000's tonnes	1,449	968	81	2,498
1980 - %	74.0	19.8	6.2	100.0
1989 - %	58.0	38.8	3.2	100.0

Source: Forestry Canada (Ref #3)

Table 3.7
Ontario's Markets

	Canada	U.S.	Other	Total
WOOD PULP				
1980 - 000's tonnes	341	948	115	1,404
1989 - 000's tonnes	439	1,063	105	1,607
1980 - %	24.3	67.5	8.2	100.0
1989 - %	27.3	66.1	6.5	100.0
NEWSPRINT				
1980- 000's tonnes	161	1,589	9	1,759
1989- 000's tonnes	192	1,659	13	1,864
1980-%	9.2	90.3	0.5	100.0
1989-%	10.3	89.0	0.7	100.0
OTHER PAPER AND PAPER BOARD				
1980- 000's tonnes	1,326	376	58	1,760
1989- 000's tonnes	1,598	774	19	2,391
1980 - %	75.3	21.4	3.3	100.0
1989 - %	66.8	32.4	0.8	100.0

Source: Forestry Canada (Ref #3)

Quebec is provided in *Table 3.5* It shows the tonnage of newsprint produced as a share of all paper products manufactured.

The dependence of the two provincial pulp and paper sectors on newsprint is high; but this dependence has been declining steadily over time. Quebec's dependence is some 20 percentage points higher than Ontario's, and this has remained so for several decades. While other producing areas of North America also compete strongly with Ontario in the U.S. market, Quebec is one of the world's largest producers of newsprint, other paper products and pulp. Its total newsprint output is more than twice that of Ontario and will be a source of continuing economic challenge to the Ontario sector over the next decade.

In the U.S. newsprint market place it is the combined production capabilities of Quebec and the Atlantic provinces that Ontario producers face when they compete for customers. While the modernity of the technology ranges widely in all three areas, those two regions heavily outweigh Ontario in total plant and equipment capacities in newsprint and pulp.

The Expansion Strategies of The Industry Across Canada Have Shown Regional Differences

The market preferences of the pulp and paper industry in Ontario emerge most palpably in the long-term growth of industrial capacity for different products. These preferences and opportunities are responses to a wide range of public policies and to the pricing of factor inputs such as wood, electrical energy, labour costs and taxes. In addition, the companies have to work within a business climate which includes external economic factors such as transportation costs, exchange rates, market size, and the competitive positioning of plants in the United States and other provinces.

The long-term market role chosen by the pulp and paper producers of Canada appears to display regional differences. In an industry where the forest resource is substantially a public asset, these differences and business preferences provide a reasonable area of future inquiry as to the role that industry-government interaction might play in Ontario in the development of successful production and marketing strategies -- especially from the perspective of sustainable development.

In the sections which follow, the production, shipments and marketing figures show regional differences not only in the composition of product production capacity, but also in the geographic markets that the products are intended for.

The Ontario Industry's Export Markets Are Not As Geographically Diversified As Those of Quebec and B.C.

In newsprint and market pulp, the percentage of Ontario's production going to the United States did not shift significantly over the 1980's. (*Table 3.7*) Paper and paper board enjoyed a measure of increased market penetration - the volume and share going to U.S. exports have both increased since 1980. The successful development of markets other than those in the U.S. is not in evidence, and as a result the industry is substantially driven by U.S. newsprint and pulp demand and by U.S. business cycles. This symbiotic relationship with the U.S. market is a key factor in the Ontario industry's future and it shows little likelihood of change.

For Ontario, the main source of export growth, and of general production growth, has been in non-newsprint paper and paperboard. Sales were up by some 400,000 tons, pulp was up by 100,000 and newsprint was up by only a little over 100,000. Newsprint still occupies the largest share of the productive capacity and it has the largest share of new capacity in the 1990-93 period.

Quebec's pulp and markets are structured somewhat differently from Ontario's. A comparison of the two producing systems shows that *(Tables 3.6 and 3.7)* Ontario sells more than twice as much market pulp into the U.S. but less than two-thirds as much newsprint. It is in the high volume of newsprint sales to the U.S. that the Quebec industry has made its largest

Table 3.8
British Columbia's Markets

	Canada	U.S.	Other	Total
WOOD PULP				
1980 - 000's	132	813	2,689	3,634
1989 - 000's	246	959	3,345	4,550
1980 - %	3.6	22.4	74.0	**100.0**
1989 - %	5.4	21.1	73.5	**100.0**
NEWSPRINT				
1980- 000's	189	909	225	**1323**
1989- 000's	197	1,028	440	**1665**
1980-%	14.3	68.7	17.0	**100.0**
1989-%	11.8	61.7	26.4	**100.0**
OTHER PAPER AND PAPER BOARI				
1980- 000's	376	37	421	**834**
1989- 000's	423	367	379	**1169**
1980 - %	45.1	4.4	50.5	**100.0**
1989 - %	36.2	31.4	32.4	**100.0**

Source: Forestry Canada (Ref #3)

commitment of resources. In paper and paperboards Ontario outperforms Quebec in U.S. markets, but it is worth noting that the long-term growth rate in new production facilities in the Quebec and Atlantic regions has been more rapid for pulp, non-newsprint papers and paperboard than in Ontario.

Quebec Has A More Diversified Market Base

The Quebec industry's market balance is more diversified than Ontario's in newsprint and wood pulp, and as a result, its risks are probably better spread. In Non-newsprint Paper and Paperboard, the industries in both jurisdictions have increased their hold on the domestic market, although Quebec appears to be growing faster in this important sub-sector and this could have further long-run, positive implications for its diversification.

British Columbia Industry Has A Highly Diversified Market Structure

The industry in British Columbia has consistently spread its risks over domestic and foreign markets *(Table 3.8)*. Its exports to non-U.S. markets in wood pulp are larger than any other region of the country. The B.C. industry's commitment to sales in U.S. markets is nonetheless, significant - although they amount to less than 2% of total U.S. woodpulp production.

In newsprint, B.C. is not the largest player among the regions of Canada, but it exports about one seventh of the Canadian total to the United States. The industry's strategy, however, is one of market diversification: for every tonne it sends to the U.S. it sends almost half a tonne offshore.

In paper and paperboard, B.C. has spread its efforts almost equally among the domestic, U.S. and off-shore markets. Over the past decade it has been particularly successful in pushing more product into the U.S. and thereby producing an improved balance in its dependence on the three market areas.

The Recent Growth in North - American Capacity

The industry is characterized on the investment side by an ability and a

propensity to undertake expansions in capacity growth which try to anticipate demand growth, and from time to time, cause the build-up of excess capacity. The situation at the beginning of the 1990's is exactly that. Demand for the industry's products is sensitive to the business cycle and declines in North American demand for pulp and paper products which began in 1989. Capacity build-up alongside this decline resulted in a drop in capacity utilization by the industry. Capacity utilization levels of plant and equipment for most products is at the low end of the range of financial comfort for most companies as profit margins have plunged into loss situations.

Standard and Poor's (Ref #31) assessment of the impact of capacity utilization on prices is:

"*Highly sensitive to capacity utilization rates, prices in the paper industry tend to fluctuate wildly. One rule of thumb is that as capacity utilization rises from 91% to 95%, prices will move up about 25%. The same modified response occurs with price movement in the opposite direction. Even wider swings can take place as utilization climbs above 95% or falls below 91%.*"

As will be seen in a later chapter, the amplitude of pulp price fluctuations is historically larger than those for newsprint but lie within the same business cycle envelope.

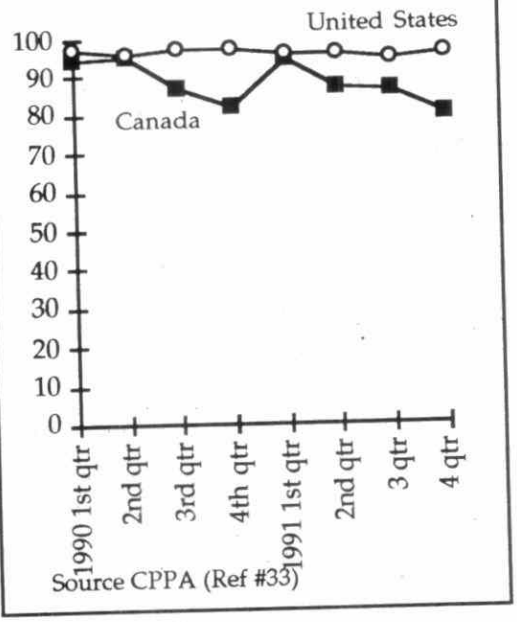
Figure 8 plots the capacity experience of Canadian and U.S. newsprint mills for the past eight quarters. The Canadian mills have had a declining trend for the period and have in all quarters been operating at levels less than the average American mill. In the final quarter of 1991, monthly averages for Canadian mills were 82%, 83% and 74% compared to 96%, 96% and 97% for the U.S. These are exceptionally low levels by historical standards.

Newsprint capacity additions in Ontario are growing faster than in other parts of Canada. This growth has to be placed in the context of recycled materials and their impact on investments. The plant additions are mainly for the processing of secondary fibres (ONP and OCC) by Atlantic Packaging (Whitby) and Canadian Pacific Forest Industries (Thunder Bay) and there has been some movement towards shutting down obsolete or surplus newsprint capacity (Abitibi, CPFI Domtar, St Marys and Spruce Falls) which will likely spread to other plants over the next year as technological obsolescence and the need for restructuring catches up with smaller, older and slower mills *(H.A.Simons ref #28).*

Investment in additional Ontario capacity for non-newsprint products (except building paper and board) will expand by a cautious 6% to 2779 metric tonnes a year. At that level these products will comprise 54% of the industry's total paper products capacity; and there is no indication of further growth of pulp capacity. These are significant indicators of the strategic intentions of the Ontario industry's management and its future objectives in positioning in U.S. and Canadian markets.

Figure 8

Comparative Capacity Utlization -Newsprint



Source CPPA (Ref #33)

Quebec Industry Has Expanded Non-Newsprint Lines More Rapidly Than The Ontario Industry.

In Quebec, the growth in the capacity to produce non-newsprint products for U.S. and Canadian markets has been faster and continues to be more sustained than in Ontario. The CPPA's annual survey of capacity intentions (Ref # 5) shows that in the 1990-93 period, Quebec non-newsprint mills will grow by 18% and add 567,000 tonnes a year, compared to Ontario's addition of 162,000 tonnes.

The U.S. Competition Is Growing in Size

Table 3.9 summarizes the results of a survey by the American Paper Institute (A.P.I.) in early 1991, of the U.S. industry's investment intentions. Standard and Poor's in its survey of industry conditions points out that over half the increase in productive capacity for U.S. pulp and paper products will come from new machines in existing mills, and all but a fraction of the remainder will come from tune-ups and improvements of existing machines. There will be very little greenfields investment out to 1994. There are distinctions between the growth of virgin fibre newsprint capacity and secondary fibre newsprint capacity which are discussed in later sections.

Canadian and U.S. Producers Are Expanding Capacity To Meet The High-Growth Segments of the Market

While U.S. demand has slowed considerably for most types of paper product, producers are anticipating the future and expanding in key areas of long-term growth such as printing and writing papers. Capacity in this market segment will be up by 2.6 million tonnes (12%) compared to a Canadian increase of 705,000 tonnes (18%) by 1993. It is noteworthy that most of this increase in Canada is scheduled to occur outside of Ontario.

Consistent with the long-term deceleration in per-capita consumption of paper packaging, industrial capacity in the U.S. in this sub-sector is declining. On the other hand, U.S. paper board capabilities will grow by just under 2% a year. In Canada, annual growth in production facilities in the 1990-93 period is forecast to be 2.8% for container board and 3.7% for boxboard.

Table 3.9
United States Pulp and Paper Capacity 1990 - 94
000's metric tonnes

	1990	1994	Change	%
Newsprint	6,162	6,721	560	9
Printing and Writing	21,908	24,479	2,571	12
Packaging and Converted	4,871	4,842	-29	-1
Tissue	5,448	6,017	570	10
Paper Board	38,173	41,294	3,121	8
TOTAL PAPER	76,561	83,353	6,792	9
Bleached Softwood	13,074	14,742	1,667	13
Bleached Hardwood	12,163	14,157	1,994	16
Unbleached	20,636	20,644	8	0
Other	13,988	13,865	-123	-1
TOTAL PULP	59,861	63,408	3,546	6
MARKET PULP	8,643	10,106	1,463	17
ALL PULP AND PAPER	136,422	146,761	10,339	8

Source; I.P.A. (Ref #22)

The Largest Build-Up of Future Competition Is In The U.S. South and North Central Regions

An area of concern for Ontario producers is the continued growth in U.S. market pulp capacity. By 1994, it will be up by 17% over 1990. By 1993, Canada's facilities will be able to produce 16% more than they were able to in 1990. This is an area of continuing competition domestically and internationally for producers on both sides of the border. The pulp industry in general in the U.S. will push ahead with more capacity in both bleached and unbleached. In the bleached pulps, the balance of U.S. capacity growth between the softwood and hardwood varieties is tilted towards hardwood pulps.

The build-up of U.S. competition for Ontario and Canada has been a long run trend. The latest capacity projections by U.S. industry do not show any significant diminution in the market pressure on the Ontario industry from producers south of the border. With a better capacity utilization rate and growing capacity levels, the U.S. industry, even during a period of recession, appears, to be strengthening its relative competitive position.

The patterns of new investment and expansion in the U.S. industry have a distinct regional focus and give some strong signals about the emerging shape of the North American pulp and paper industry in the 1990's. *Table 3.10* shows the rising economic power of the North-Central and Southern-based pulp and paper companies.

Table 3.10
Changes in United States Capacity
000's metric tonnes
1990-94

	1990	1994	Change 1990-94		% of Total Capacity
North East			Tonnes	%	Change
Paper	10,925	11,508	582	5.3	5.6
Pulp	4,385	4,433	48	1.1	0.5
Total	15,311	15,941	**630**	**4.1**	**6.1**
North Central					
Paper	14,379	15,850	1,471	10.2	14.3
Pulp	4,550	4,640	91	2.0	0.9
Total	18,929	20,491	**1,562**	**8.3**	**15.1**
South					
Paper	41,836	45,691	3,855	9.2	37.4
Pulp	41,106	44,291	3,185	7.7	30.9
Total	82,942	89,982	**7,040**	**8.5**	**68.2**
West					
Paper	11,344	11,975	630	5.6	6.1
Pulp	9,820	9,816	-5	0.0	0.0
Total	21,165	21,791	**626**	**3.0**	**6.1**
United States					
Paper	78,485	85,257	6,772	8.6	65.7
Pulp	59,861	63,404	3,543	5.9	34.3
Total	138,346	148,661	10,315	**7.5**	**100.0**

Source;I.P.A. (Ref #22) - Some categries excluded, numbers may not add.

The South in particular is a serious competitor for Ontario and Quebec producers. It has some 4 million metric tonnes of newsprint capacity, (c.f Ontario and Quebec's 6.7 million tonnes) which is poised along the southern rim of the large North Eastern markets, and favourably placed to compete in Florida and other large U.S. Southern markets. Since sixty-eight per cent of the increase in total U.S. pulp and paper capacity in the four year period will be located in the South and another fifteen percent in the North Central areas, the Ontario and Quebec industries both face growing competition from a U.S. industry whose geographic focus is moving away from the older areas of production in the West and North East.

The Build-Up In U.S. Market Pulp Capacity Is Particularly Strong

The expansion plans of the U.S. industry in terms of pulp also paint a picture of changing economic geography for the industry in that country. Similar to those of Ontario, the plans of Western U.S. producers are for little or no growth in pulp making capacity. Even the North Central states plan for a small level of growth. The only really significant region of planned expansion in pulp plants is the U.S. South. At 44.2 million tonnes and still growing, this capacity is almost ten times the size of Ontario's planned 1993 total pulp capacity of 4.7 million tonnes.

The U.S. expansion planned for the 1990 - 94 period is 3.2 million metric tonnes which is equal to 24% of the combined Ontario and Quebec capacity of 13.3 million tonnes. In the market pulp category, where Ontario has 1.2 tonnes of capacity and no plans for significant increases, Southern U.S. producers will increase capacity by 1.4 million tonnes in the four years -- an amount equal to almost fifty percent of the combined 2.9 million tonnes of Quebec and Ontario.

These strong future market signals come from a U.S. regional sector which is modernizing and expanding, and contrasts with the Ontario sector which is neither in the same market position nor pursuing the same expansion strategies.

The world outlook for capacity in the industry from 1990 - 1995, as outlined in the F.A.O. 's survey, is provided in *Table 3.11 (Ref #21).*

The Global Outlook Is For Continued Capacity Expansion

These projections parallel quite closely the outlook for North American markets, and are also close to some of the key North American trends such as the high growth of printing and writing papers, the reductions of mechanical pulping in favour of thermo-mechanical, and, the continuing steady growth of chemical (kraft) pulping capacity. On the increasing efficiency in the use of pulp in the paper furnish and the use of substitutes and fillers, the F.A.O. survey says:

"The current survey suggests that the ratio between pulp and paper capacity will continue its decreasing trend but somewhat more steeply than in previous surveys, falling from 71.8 in 1989, to 70.7 in 1990 and 67.5 in 1995."

That trend has dropped steadily over the past few decades. In 1972 the F.A.O. estimated it was at 80.7. That implies a 16% decline over two decades in the amount of pulp used to produce a tonne of average paper products by the global industry .

The newsprint projections are not uniform throughout the world. The F.A.O estimates for Western Europe show capacity growing at 4.1% compounded per annum up to 1995, while those in North America show a much lower rate of 1.8%. Asian capacity is planned to grow by 5% a year which is a reflection of the lower levels of per-capita consumption and the movement up the consumption curve as GNP and consumer incomes go

Table 3.11
Projected World Capacity in Pulp and Paper
Million Tonnes

	1990	1995	Change 1990-95		
			Tonnes	%	% p.a.
Pulp	168.6	185.6	17.0	10.1	1.9
Thermo-mechanical	20.0	24.7	4.6	23.2	4.2
Other mechanical	23.5	23.3	-0.2	-0.7	-0.1
Semi-Chemical	9.3	9.4	0.2	1.7	0.3
Chemical	114.9	127.2	12.3	10.7	2.1
Other	15.6	16.0	0.4	2.6	0.5
Dissolving	5.3	4.8	-0.4	-8.5	-1.8
Paper & Board	260.5	298.8	38.3	14.7	2.8
Newsprint	36.4	41.7	5.3	14.6	2.8
Printing and Writing	74.2	90.3	16.1	21.7	4.0
Other Paper and Board	149.8	166.8	17.0	11.3	2.2

Source F.A.O. (Ref # 21)

through the early-growth stages of economic expansion. Eastern Europe shows a projected decline of 7.0% in newsprint capacity, and a zero capacity growth out to 1995 is forecast for Russia.

Against this backdrop of changes in world and North American capacity, the issue of the fibre supply constitutes an important economic factor in the outlook for the Ontario industry. This is discussed in the next section.

The Wood Fibre Situation

The economics of the pulp and paper industry rest on the quality, supply and accessibility of the forest resource; but, the term "forest resource" inadequately defines the target of industrial concern. The starting point for a forest products company is the chemistry and the physical properties of the wood fibre. Within the generality of the wood resource there are specific fibre qualities belonging to different species of tree which determine the economic potential of the resource. Technology has pushed the boundaries of these opportunities and introduced additional tree species into the process, (e.g. eucalyptus hardwoods), new and more effective ways of maximizing the use of the available fibre in a tree (e.g. CTMP), and, new ways of mixing fillers and different fibres in the furnish so as to achieve different qualities in various products (e.g. hardwood and softwood fibres).

MISA Is Concerned With The Chemistry of Fibre Utilization

The problems of environmental pollution which MISA is attempting to solve, originate with the chemistry of separating the cellulose from the lignin and of re-binding and reforming the fibres into consumer and industrial products.

The problem which industry is attempting to solve is the optimization of its chemical, technical and marketing systems so as to derive a high quality, competitively priced product to sell in U.S. and Canadian markets. Each company has an implicit or explicit "fibre strategy": it needs fibres of a certain kind to operate, and it uses the economic opportunity afforded not by trees so much as by the chemical and physical properties of the fibres.

A Fibre Strategy Seeks to Optimize Economic and Social Returns

From a broad economic, environmental and social policy perspective, a critical issue for Ontario is "What is the best fibre strategy for the economic use of the forest resource?" A fibre strategy, whether public or private, defines and manages woodlands, trees and their fibre content in a way which economizes stringently on the consumption of all three elements and encourages industry to squeeze from the resources the maximum feasible in economic and social returns.

In the same vein, Standard and Poor's regards timberlands (fibre resources) as a potentially good investment in an age when environmental constraints, such as the protection of the spotted owl and mature timber stands in the U.S., are making access to the fibre pool progressively more difficult. They state *(Ref #32)*

As the old-growth timberlands held by national and state governments are withdrawn from the market, the remaining secondary-growth timberlands in private hands will increase in value.....For the large forest products companies, however, owning a substantial base of timberland means owning the ability to ride out periods of high stumpage fees, or as we saw in 1990, a period of unavailability of timber."

Ownership of the resource, or access to a secure supply, does have an economic value which in countries with a high degree of public ownership is difficult to charge at market rates because no domestic market exists. In these circumstances, other measures of the forests' economic value, such as employment generation tend to be important in "pricing" the annual cost of the wood (stumpage) to producers. For companies with international production and marketing perspectives, the economic values such as replacement costs, and potential final value, rate of return, and the strategic scarcity or abundance of the of the fibre inventory in the forest, are matters of major commercial concern.

Among the items of considerable weight in the successful implementation of a fibre strategy is the allocation of responsibility for the management of the woodland resource. The inter-action of government and private sector interests is handled differently in the main producing countries.

Table 3.12
Public and Private Ownership
Of Producing Forest Lands

	Total	Public	Industry	Private
	Hectares	%	%	%
United States	774.4	0	0	0
Forest	291.9	46	10	44
Timber	482.5	28	14	58
Canada	243.7	91	-	9
Ontario	38.3	94	-	6
Sweden	23.5	26	25	49
Finland	20.1	24	9	67

Sources: Journal of Forestry; Tapion Vuosikatsaus; Forestry Canada (Ref #'s 37,38 39)

Canada's Degree of Public Ownership of The Woodland Resource Is Unique

The degree of public ownership of forest properties is unique to Canada among the world's four largest paper producing countries: the U.S., Finland, Sweden and Canada. *(Table 3.12)* The U.S. federal and state governments have a large stake in the stewardship of "timber" lands - which are those primarily available for industrial uses. At 28% of the forest area this is about equal to the level of government ownership of Swedish and Finnish woodlands.

Ontario's public ownership position in timberlands, at 94% of the total area available is higher than any other competing international jurisdiction. Conversely, the levels of private and company ownership of productive forest lands is over 70% in Sweden, the U.S. and Finland.

In Sweden, public lands are managed by the National Forest Enterprise on a revenue-generating basis. No government appropriations are provided for timber management *(Ref #38)*. A fixed charge plus a percentage of profits is returned to the national treasury. Ownership of forest lands by companies in Sweden amounts to 25% of the total hectares, and half of this is owned by two companies. Sweden's private forestry sector also has a highly developed network of cooperative associations which produce about a tenth of the country's forest products.

In the U.S. forest industry ownership is not as concentrated but four companies own about 5% of the available timber land. (International Paper, Champion International, Weyhauser and Georgia-Pacific).

In Finland, the National Board of Forestry is the central organizing body with two arms, one for the private sector and one for the public. Finnish law regulates the management of privately-held woodlands through the Law Concerning Private Forests. It establishes minimum standards for forest utilization, prohibits forest devastation and provides for compulsory regeneration. Some 15% of receipts from clear cutting on private lands is allocated for regeneration. Within the scope of the National Forest Board, a Central Forestry Board administers the regulation of private woodlands. It is sup-

ported by a network of 19 district forestry boards and 375 local forest management associations. The structure is highly co-operative as well as administrative and regulatory.

Ontario's System of Public Ownership and Private Stewardship

Ontario's forests are managed by a system of some 28 Forest Management Agreements (FMA's) which are licence arrangements; 51 Crown Management Units (CMU's) which are areas administered exclusively by the government; and 14 Company Management Units (CMU's) where the management responsibility is shared by government and the private sector. The FMA's are renewable in set time periods, and require the development of a forestry management plan by the company. They make provision for allowable cuts, silviculture practices, joint public and private uses, environmental protection of the forest resource and expenditures on improvements and road access by the government as the owner of the land and the company as the lessee. The system of FMA's is integrated into the Environment Assessment process. That generally requires the FMA to have been processed via a class environmental assessment which can be "bumped up" into a full environmental assessment on an appeal to the Minister.

Generally the FMA's do not concern themselves with commitments in economic matters such as employment, research and development, investment, marketing and management issues. They do make provision for government spending on forest management (unlike the Swedish system). Federal-provincial agreements concerning forestry development, which are now expiring or fully expired, did include provision for research, forestry protection and site preparations and forest regeneration. In 1988 in Ontario these expenditures amounted to $29 million. *(Forestry Canada Ref #3)*

Table 3.13 shows an estimate of the allocation of forestry management expenditures by the two governments and private industry in 1988 in Ontario.

The relative shares show the province to be spending nine times more than the private sector in that year.

Ontario's Fibre Supply Strategy Is Based on Maximum Sustainable Yield

Forestry Canada *(Ref #37)* described the current forestry management strategy of most provinces as follows:

"Sustained yield is a principle that has long been entrenched in the resource management policies of most provinces. While the specific interpretation of the principle varies somewhat, the underlying premise is the continuous and where possible increasing flow of long-term timber supply. "

This basic principle also underlies the Swedish and Finnish programs, although as was pointed out in the above commentary, the structure of incentives and cost allocations is somewhat different because of the differences in ownership of the resource.

The data on the harvesting and supply of Ontario's various wood species is provided in *Table 3.14* Inventories of merchantable wood are subject to variable interpretations and present technical difficulties; however, the data show that the bulk of the measured Ontario inventory, public and private, is in softwoods of the spruce and pine variety. The hardwoods consist mainly of aspen and birch and make up close to 30% of the inventory. The highest rates of utilization for pulpwood purposes are among the softwoods where consumption by mills is 85% of the total used for pulp.

The Swedish Experience Is Instructive

The high degree of reliance on spruce and the value of pine as a kraft pulp raw material, creates competitive economic tensions between the potential lumber industry uses and paper industry uses for these woods. The under-reliance on hardwoods such as aspen, is interesting in light of the fibre strategy of Sweden which stress the increased use of these species in TMP and CTMP plants. It is also interesting in light of the rise of highly competitive eucalyptus hardwood pulp facilities in the Iberian peninsular and various countries in the Southern hemisphere.

Table 3.13
Canada-Ontario
Forestry Expenditures - 1988

	$ million
Province:	319.1
Federal:	40.8
Industry:	36.0
Total	395.9

Source: Forestry Canada (Ref #3)

Silviculture practices in Sweden are intensive and rigorously enforced at the local (country) level. They have allowed the progressive expansion of the annual growth of harvestable forest crop over time. Clear cutting followed by reforestation within three years is the general obligation. In the 1920's annual growth was just under 60 million cubic meters of wood, in the 1990's it is around 90 million cubic meters. Annual cut rates have occasionally equaled the growth rate but never exceeded it. As a result, Sweden has underutilized forest inventory with potential for economic development. *(Bo Wergens Ref # 40)*

Fibre Properties and Technology Are Key Building Blocks for Scandinavian Industry

Ingemar Croon *(Global Outlook Ref #34)* an authority on Swedish pulp and paper technology, observes that the use of silviculture measures in Swedish forests has resulted in a forest growth rate that is 40% higher now than in the 1940's. Annual forest growth today is 98 million cubic metres, whereas cutting consumes 65 million cubic metres. From this he concludes that Sweden has a reserve of underutilized wood which could be used to generate about 1.5 mil-

lion tons of pulp and paper a year. In a later article in Paper Technology for the World *(Ref #35)* he states that in the 1990's Sweden would have sufficient wood resource to expand production even further -- by as much as 3 million tonnes. He also notes that:

"As the wood becomes more and more expensive, the value added and the economic revenue per cubic meter have become an important guide for future strategy."

Table 3.14
The Ontario Forest Resource
Merchantable Wood and the Harvest

	Inventory 000,000's m3	% Distribution Of Species	1985 Consumption Pulp wood 000's m3	% Use
Hardwoods	**1,325**	**37.5**	**1,785**	**14.8**
Aspen	685	19.4		
Birch	361	10.2		
Maple	200	5.7		
Other	79	2.2		
Softwoods	**2,205**	**62.5**	**10,280**	**85.2**
Spruce	1,335	37.8		
Pine	578	16.4		
Fir	188	5.3		
Hemlock	17	0.5		
Douglas	72	2.0		
Larch	15	0.4		
Total	**3,530**	**100.0**	**12,065**	**100.0**

Source:Forestry Canada (Ref #3)

The properties of long-fibred softwood kraft, as Croon *(Ref #35)* points out, are valuable in the production of linerboard, sack kraft, folding boxboard, and liquid containers. Sweden's fibre inventory consists of 12%-16% hardwoods. This allows only a small volume of production of pulp as short-fibre kraft. To overcome this, there has been increased emphasis on the use of CTMP to achieve high brightness for printing products.

The quality of *long-fibre spruce* produced by Swedish CTMP processes, he cites as having reached a "relatively high standard" which can be used in fluff pulp, carton board and tissue papers. But the *spruce* fibres, produced by CTMP are not suitable for writing paper. The technology for a short-fibre *spruce* pulp from CTMP has not yet developed for widespread use. He indicates that:

"Spruce wood, including timber, has its highest value as raw material for TMP,

Table 3.15
CTMP and TMP Pulp Production
000's tonnes

	World	Sweden	Canada	U.S.	Other
1990	20,094	2,380	6,911	3,144	7,659
1995	24,658	2,505	8,674	3,214	10,265
	%	%	%	%	%
1990	100.0	11.8	34.4	15.6	38.1
1995	100.0	12.5	43.2	16.0	51.1

Source; FAO (Ref #21)

PGW and CTMP integrated into paper and board."

and forecasts that in Sweden:

"The uses of spruce for saw-lumber purposes will disappear over time and it will be used instead for high-yield (TMP-CTMP) pulps."

The diversion of the fibre from lumber to the higher value-added stream is seen as a natural economic progression for a fibre strategy in the interplay of technology, factor costs (energy) and markets.

He concludes that CTMP *aspen* fibres are well suited to printing and writing papers but that Swedish forests contain only 1% of the aspen variety. (Cf Ontario's 19.4%) In a 1990 article for PPT,(Ref #36) he takes the case of CTMP and aspen further:

"The new star within the family of CTMP is aspen. This pulp is excellent for use in tissue and coated and uncoated printing paper."

Sweden led the world in the development and adoption of CTMP technology in the 1970's. Energy costs and availability problems have slowed its recent progress in that country but have not diminished the emphasis in the Swedish industry's planning for research and development in the technology. Although it is an energy-intensive process, it has been attractive in large part, because of its wood-conserving properties in the production of a high-yield pulps. This is an economic advantage since Swedish wood costs are internationally high. It also has a superior environmental performance over kraft chemical processes and Swedish environmental standards are high by international standards.

Its ability to produce good quality working fibres from hardwoods have helped to overcome the disadvantages of high unit production costs. A current concern is the barrier to industry growth presented by the high cost of the energy required for TMP and CTMP processes. For the Swedish industry, the reduction of these costs has therefore become a major objective for its programs in science and technology. Technology, in this way, has become a connecting link between the fibre strategy, the environmental strategy and the industrial-economic strategy.

Canadian use of the CTMP and TMP processes has expanded in a very dramatic way. Because of the lower costs of electricity in Canada, the development of a CTMP - based fibre strategy by companies in some provincial jurisdictions (and presumably with government encouragement) has been rapid and the nation has become a world leader in this

area. The FAO survey *(Table 3.15)* shows that Sweden moved from having total leadership and 100% of world capacity in the early 1980's to a position of having only 11-12% in the 1990's. Canada, meanwhile moved up quickly and became the world's largest single user of the processes. Ontario has not participated in this technological wave which now produces some 15% of Canada's pulp and 43% of the world total.

Overall, the fibre strategy of Swedish industry is centred on the advantages of long-fibre kraft and the use of high brightness, short fibre, mechanical and chemimechanical pulp as a supplement to hardwood kraft. This strategy is supported by a vigorous research and development program combined with correspondingly high levels of investment in advanced capital equipment.

In the general economic conclusions concerning the linkages between a fibre strategy, technology and marketing, Croon observes that Swedish companies decided in the early 1980's that the best strategy was a conservative one of investing in the world's fastest, largest and most efficient machines for newsprint; this in turn meant restructuring of the industry. The Finnish strategy was to increase the economic value of the fibre inventory and to economize on its use by developing innovative, value-added products. The Finnish industry designed new machines for that purpose and adapted existing machines to more advanced production methods.

The choices between adaptation and innovation have also been faced by Canadian producers as the increase in capital intensity of the industry has made the price of greenfields plants more difficult to accommodate within the budgets and cash flows of smaller companies. Adaptation as a strategy has finite limits. Some economies of scale and scope have been possible for some producers in the transformation of the fibre into commercial products such as specialty papers, but in the long run the maximizing of fibre values involves substantial and continuous investment in new plant and equipment, technology research and development, skills and product quality.

Competition From A New Quarter.

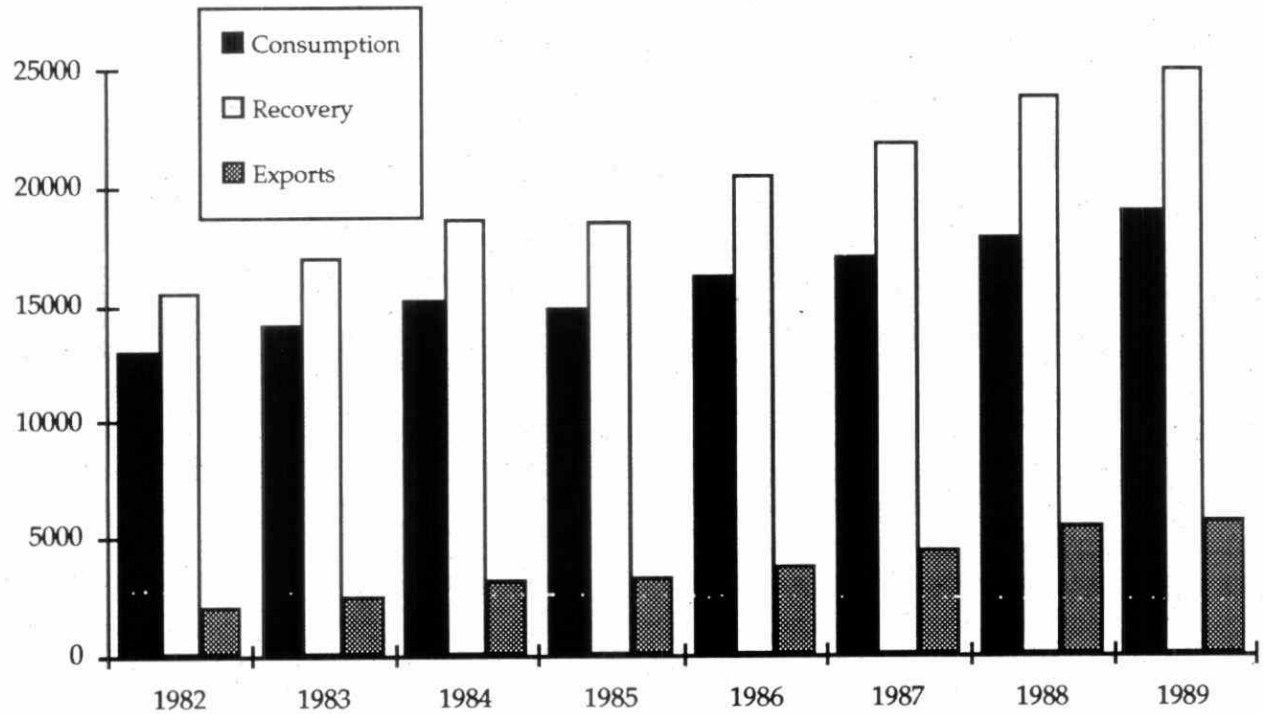
Another source of fibres, and an important aspect of a fibre strategy is the waste paper, or secondary fibre, market. It is developing quickly in North America and Europe and has already had a significant impact on company investment plans. The next section examines that issue.

Strategic Aspects of the Secondary Fibre Market

The economic role of secondary fibres in paper markets of the 1990's has a high probability of being an increasingly important one. Legislation, policies and programs governing minimum recycling content and curbside collection in the U.S. and Ontario ensure that the use of recycled fibres from old newsprint (ONP), old magazines (OMP) and old cardboard (OCC) will be at a sufficient

Figure No 9

U.S. Secondary Fibre Markets
000' metric tonnes



Source; U.S. Department of Commerce

level to impact on the future structure and economic performance of the pulp and paper industry in the province. Its most significant consequence will be to exert a downward pressure on virgin pulp and newsprint prices, and, to drive small, inefficient newsprint mills closer to the boundaries of economic viability.

The U.S. market for waste paper is large and well established. The Canadian market, while growing and well founded, is small by comparison. *(Figure 9)* Export growth and domestic market growth in the U.S. have been steady and are expected to remain so. Legislation requiring the use of recycled materials in newspapers and government purchases is either in effect or being considered in half the U.S. states. Many U.S. companies and organizations have adopted purchasing policies to favour recycled paper products. The demand for recycled raw material, originating with new recycling plants, could possibly exceed the available North American supply in the 1990's. *(H.A. Simons Ref #28)*

The U.S. Has A Large Private Market Infra-Structure Which Is Connected to World Secondary Fibre Markets

U.S. recovery levels of waste paper have exceeded 20% since the early 1970's. Japanese recovery rates of 50% and EEC

recovery rates of about 45% have been historically well above the world average - which is in the 30-35% range - while the U.S. rate has stayed below it. This is because of the shortage of wood and fibre resources in those countries. *(Ref #41).* The high quality and homogeneity of U.S. waste paper fibres have long placed them in demand in world secondary fibre markets.

Of particular importance to the price and supply/demand conditions in Ontario is the role and strength of the private and public sector infra-structure in the U.S. -particularly in the border states of the North East. In a survey by Pulp and Paper magazine *(Ref #42)* it was shown that in 1980 the port of New York/New Jersey handled export traffic in waste paper amounting to 1.42 million tons. On the West Coast, three ports handled another 2.2 million tons. The American economy is accustomed to extensive trade in secondary fibres.

There is a highly organized brokerage and paper bailing industry in the U.S. which has developed an export trade with Asia and Europe that now exceeds 6 million metric tonnes a year. To put that in perspective, that trade is a third larger in tonnage than Ontario's annual output of paper and paperboard products, and three times as large as the total Canadian consumption of waste paper. *(Table 3.16)* The combination of the size of the outflow in relation to Canadian domestic demand, plus the growing level of foreign demand for the product, indicates that U.S. exports and domestic prices will exert a strong influence in balancing the supply and demand forces at work in the North American market. Canadian prices for ONP are already influenced by international supply and demand as well as domestic, and this will continue.

Table 3.16
Canadian Waste Paper Consumption
000's tonnes

		Change	
		Tonnes	%
1975	610	-	
1980	1,192	582	95.5
1985	1,442	250	21.0
1990	1,787	345	23.9

Source; CPPA (Ref #7)

These export markets, are nonetheless, cyclically sensitive and do contribute to a certain amount of price instability in waste paper. In recent times for example, foreign and domestic demand have followed the contours of the recession in North America and Europe -- prices have weakened and tonnages are down. This is happening at the same time as new recycled pulping capacity is coming on stream and new sources of municipal and industrial supply have expanded because of legislation to protect landfill sites.

The Level of Displacement Of Conventional Paper Making Facilities Is Becoming Significant

The Canadian consumption of waste paper increased by 600,000 tonnes in the 1980's *(Table 3.16)* -- a rate sufficient to have offset the pulp production required by two good sized, world-scale newsprint plants -- allowing for about a 20% fibre loss in the recycling process.

At the same time, U.S. domestic consumption of waste paper rose by some 5,500,000 metric tonnes *(Figure 9)*. With an 80% recycling recovery rate, that volume would produce about 4,400,000 tonnes of finished material -- an amount sufficient to offset the need for about 20 large newsprint machines.

These numbers are only illustrative of the potential economic impact of secondary fibres on the market place and plant capacity for virgin fibres. In reality, the recycled waste is of varying quality and types and finds its way into a range of production systems and products - some of them not related to the pulp and paper industry. The future production displacement process could work through a number of distinct commodity markets, such as kraft market pulp, which is used for a variety of purposes and which could encounter competition across the broad front of its conventional outlets as recycling capacity increases.

Recyclers Are Aiming For Long-Term Security of Supply

Because of the rapid growth in new deinking and recycling capacity in the U.S. and Canada there has been a scramble to secure long term sources of waste paper supply at stable prices. As a result, strategic alliances have sprung up between pulp and paper companies, waste paper companies, and local governments in an effort to stabilize the raw material supply and prices. The contracts have a variety of bidding arrangements, time durations and price clauses. In many U.S. municipalities the collection of waste is still handled by the private sector, and in some the recycling programs are also in private hands. The level of participation by the private sector tends to be generally higher than in Canada, even where government regulation is a driving force for the collection and recycling of secondary materials.

The future economic landmarks of the expanding North American secondary fibre market are not clearly visible from the trough of a recession: the shape of the recovery in newsprint is uncertain; the role of the Canadian economy in the recovery is unclear and may in fact have undergone a sectoral and structural change because of Free Trade. In addition, the expansion of paper production capacity in the South and North Central U.S. must be of some concern to Ontario producers. It is a growing competitive force that will meet head on with Canadian attempts to recapture market demand lost during the recession.

As an example of the possible global market conditions for pulp and paper producers using virgin materials, the long term outlook for the composition of paper furnish has been estimated by the PPI Journal *(Ref # 43). (Table 3.17)* It shows that 91,690,000 tonnes of additional furnish will be required for Paper and Paperboard production in the decade 1990 - 2000. It forecasts however, that more than half of that new requirement for furnish will be met by pulp made from recycled fibres.

Table 3.17
World Growth In Sources of New Furnish
For Pulp & Paper Products
1990 -2000

Furnish	Increase In Use 000's Tonnes	% Share of Increased Use
Mechanical pulp	5,760	6.3
Bleached sulphate	14,470	15.8
Unbleached sulphate	4,800	5.2
Sulphite	-1,860	-2.0
Semichemical	1,160	1.3
Nonwood pulp	4,650	5.1
Recycled Pulp	**47,210**	**51.4**
Pigments	15,500	17.0
Total Raw Material	**91,690**	**100.0**

Source PPI (Ref #43)

This scenario would see the expansion of recycled pulp as a world-wide competitive challenge to existing virgin pulp and paper production. The global growth of the recycled commodity's availability would have a counterpart growth in demand for its use, and it is difficult to imagine that this would not set some constraining boundaries around North American pulp prices. Adding this scenario to that of the FAO *(Ref #16)* and Simons, Woodbridge Reed *(Ref. #'s 11 & 9)* where surpluses of pulp and paper products are forecast for the main producing regions, leads to the conclusion that the medium-term future is for more intensified and more globalized markets rather than a continuation of the present tendency for continental self-sufficiency and markets which are geographically segmented and self-contained. Surplus commodity capacity (or high inventories) will lead to incentives for more pulp and paper producers to globalize their activities and to compete internationally over the next decade.

The Outlook For Secondary Fibre Supply and Demand

The 1991 H.A.Simons Report for the Ministry of Industry Trade and Technology *(Ref #27)* argues convincingly that in meeting the new competition, only a half of Ontario's current newsprint capacity is cost-competitive, and, that newer and larger Southern Ontario recycling plants have scale and location advantages over most Northern mills. It argues further that the newer U.S. mills will be positioned close to the "urban forests" of the U.S. The report summarizes three estimates of the 1995 demand for ONP - a key emerging economic indicator for Ontario pulp and paper producers.

It should be noted that "demand" and "supply" of secondary fibre materials have a constrained meaning since the collection and use of recycled materials is increasingly a matter of regulatory or quasi-regulatory intervention. Excess ONP inventories have accumulated in earlier years in Ontario despite depressed market prices and demand forces which would, in free market circumstances, have produced a cut-back in supply and adjusted the price. For a period of time, the Ontario government even provided financial support to permit exports so as to reduce excess inventories. The normal price-elasticities of supply and demand for recycled paper materials in many areas of North

America may therefore be affected because of structural and regulatory rigidities in the garbage collection and disposal system, and because of government and corporate policies. With many U.S. states now making recycling a mandatory issue, the supply side will be buoyant, regardless of the economics of collection and demand.

The H.A. Simons Report quotes various estimates of supply in the North-East quadrant of the continent ranging from 2.6 million to 4.5 million tonnes. Demand in the late 1980's in this area was on the order of 1.5 million tonnes. The report concludes that the demand for ONP for all purposes in this quadrant of the continent will reach 3.3 million tons in the mid-1990's.

The report maintains, there could be a local supply deficiency of about 680,000 tonnes in Ontario, Quebec and the Maritimes. Of that, 560,000 will be in Quebec and the shortfall in Ontario could be more than 100,000 tonnes. Both provinces in this scenario would need to import from the U.S. North East where there will be a surplus in excess of local demand (and production capacity) of about 590,000 tonnes a year. The role of price, as noted above, in balancing supply and demand, will be played out mainly in U.S. and world markets.

This forecast, if correct would give a considerable commercial and cost advantage to those plants in Ontario which have invested in an efficient scale of recycling facilities. The prohibitive costs of refitting old, small newsprint mills could well preclude many existing plants from staying in an increasingly competitive market in which the virgin product is in a surplus capacity situation and raw materials for recycled furnish are in demand.

Additional Recycled Newsprint Capacity Is Being Positioned For Expansion Into Market's of the 1990's

Pulp and paper secondary materials have become one of the fastest growing niche markets in North America. Capacity additions in the newsprint side of the industry reflect the speed and flexibility with which some suppliers, especially U.S. suppliers, have adapted to the new climate. Unless some form of transportation backhaul is involved with large clients, the economics favour locations close to the urban sources of supply. This is where most of the new recycling facilities have located.

The figures in *Table 3.18* provide the size and location of the capacity build up in recycling facilities in North America. The data show existing plants and new plants. The latter are either under construction or announced. The increase in capacity, if fully realized would add some 8 million tonnes of ONP recycling capacity. The U.S. share will be higher than its portion of the continent's newsprint markets - which indicates the aggressive investment and marketing programs the U.S. industry is embarked upon. At the same time as the producers in both countries achieve this increase they plan to phase out old facilities and to convert almost 4.5 million tonnes of existing virgin pulp production into recycling plants.

Table 3.18
ONP Recycling Capacity in North America
000's Tonnes

	U.S.	Ontario	Quebec	B.C.	Total
Established Capacity					
1989	1,507	310	0	0	1,817
New Capacity					
1991	695	134	0	0	829
1992	838	559	881	300	2,578
1993	390	0	478	0	868
1994	230	0	0	0	230
1995	1,063	0	522	0	1,585
Total	**4,723**	**1,003**	**1,881**	**300**	**7,907**

Source CPPA and H.A.Simons (Ref Nos 5 & 28)

The construction plans for Quebec's recycling industry are scheduled to peak a little later than the Ontario expansions. This could mean some delays or postponements in the Quebec industry plans if the tight supply situation forecast for that province by H.A. Simons is sufficiently large to deter financial commitments.

The financial cycles of the pulp and paper industry bear directly upon the investment activities. Their behaviour over the next few years will be critical to the ability of the Ontario industry to undertake not only restructuring and investments in new plant for competitive reasons, but also investments which promote improved environmental abatement.

Industry Finances

The cycles in the earnings and cash flows of the pulp and paper business correlate well with the business cycle. In *Table 3.19* the Ontario industry's taxable income picture is shown from 1970-1987. The level of taxable income is affected not only by revenues and costs but also by capital depreciation allowances and losses brought forward, so that to obtain the cash flow position and retained earnings would require more detailed and complex analysis. Taxable income is therefore used here as a general index of the size of the swings in revenue flows.

The experience in the 1980-82 period and the subsequent recovery is instructive and could provide a template for the near-term future. Taxable income for the Ontario industry dropped by some $300 million when the recession hit, from a peak level in 1980 of about $410 million, Capital spending, meanwhile, stimulated by government assistance programs at that time, rose as the economy peaked, but continued into 1981-82 at high levels. As the economy was entering the recovery phase in 1983, there was a delayed response to the cyclical downturn of 1981 -- capital spending dropped by almost a half and stayed below previous peak levels for

two years until 1985 when it displayed a lagged response to the improvement in the general economic climate. It took until the late 1980's for the capital spending program to return to its previous peak levels of the early 1980's.

Environmental Spending Also Fluctuates

Expenditures on "end-of-pipe" environmental measures (water and air) also appear to have fluctuated. As capital equipment is put in place, additional external systems are also needed and this is reflected in the size of those expenditures. It is of some note that "end-of-pipe" spending has declined in relative size since the late 1970's and early 1980's. The drop, as a share of total capital spending, is significant. From levels of 10% of all capital and repair spending in 1982, the figures for the late mid- 1980's were down to the 1.5% range, and subsequently recovered to the current level of about 3% - 4%.

The performance in this area was probably accentuated by the previous business cycle and a large stimulus at the beginning of the decade from the grants provided by the federal and Ontario governments. The subsequent drop-off was a consequence of the termination of that program and the absence of significant new regulatory abatement measures. Capital expenditures increased over the business cycle, but outlays on external environmental improvements did not return to their former peaks. These expenditure data do not apply to in-plant processes, so that it is not possible to comment on substitution of in-plant for ex-plant abatement technology.

The outlook for the timing and scope of future investment expenditures, is similarly conditioned by the current state of the business cycle and the industry's financial position as it moves through the cycle towards the recovery phase.

The Industry Is Currently On the Downward Slope of the Financial Cycle

The present downswing in pulp and paper company earnings (before extraordinary items) began in 1988-89 and has continued since then. The magnitude of the slide is shown by the size of the accumulated losses between the second half of 1990 and the end of 1991 for four of the larger companies operating in Ontario. They amounted to $637 million for this group of companies.(*Table 3.20*) Since that time, other reports have indicated that in the first quarter of 1992, these companies lost a further $169.7 millions. Parts of these losses were attributable to other forest products and other activities of the consolidated operations.

The long slope of the recovery part of this business cycle and the duration of its trough are perhaps indications that the financial recovery could be slower than normal. The earlier examination of the industry's position relative to secondary materials and newer product markets would also suggest that the financial recovery may not be swift for all companies. Certainly, a financial retrenchment of this size is likely to be accompanied by reorganization, downsiz-

Table 3.19
Ontario Pulp and Paper Industry-Income and Expenditures
$ Million

	Taxable Income	Capital & Repairs		Environment as % of	
		Plant & Equipment	Environmental End-Of-Pipe	Taxable Income	Capital & Repair
1970	58.3	162.5	na		
1975	107.6	282.6	na		
1976	70.5	392.4	na		
1977	81.3	385.2	na		
1978	151.9	289.3	na		
1979	284.8	404.8	na		
1980	409.9	530.7	36.8	9.0	6.9
1981	365.4	898.7	72.2	19.8	8.0
1982	108.6	810.0	80.6	74.2	10.0
1983	174.8	493.3	24.1	13.8	4.9
1984	288.3	608.7	16.4	5.7	2.7
1985	391.0	908.8	13.4	3.4	1.5
1986	439.5	678.8	9.7	2.2	1.4
1987	628.1	778.7	11.7	1.9	1.5
1988	na	1,026.9	39.0		3.8
1989	na	1,332.2	55.5		4.2
1990	na	1,241.9	42.0		3.4

Source: Forestry Canada (Ref #3) and data from CPPA

ing and closures of inefficient plant in addition to those already experienced.

The next section examines some of the long-term trends in world and U.S. demand for pulp and paper products.

Table 3.20
Net Earnings of Selected Pulp & Paper Companies
($ millions)

	1988	1989		1990		1991	
	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half
Company							
Abitibi	89.7	55.1	-3.1	27.6	-18.3	9.2	-40.3
CPFP	174.8	138.0	82.1	13.4	-20.8	-106.5	-151.5
Domtar	50.0	51.0	17.0	-39.0	-59.0	-65.0	-83.0
MacMillan	143.7	141.7	105.0	58.8	-8.0	-7.5	-85.9
TOTAL	**458.2**	**385.8**	**201.0**	**60.8**	**-106.1**	**-169.8**	**-360.7**
Half-yearly Change		**-72.4**	**-184.8**	**-140.2**	**-166.9**	**-63.7**	**-190.9**

Source: Canadian Paper Analyst (Ref #30)

4. LONG TERM ECONOMIC TRENDS

The long-term composition of demand in industrial countries for paper is shifting steadily towards higher quality commodities, finished papers and innovative products. U.S. per-capita consumption of newsprint accelerated in the mid-1970's and 1980's, although there are signs of a possible change in this trend. The U.S. market for newsprint will likely grow at a trend rate of about 2% over the 1990's, with a possible short-term surge of 3% - 5% as the economy pulls out of the recession.

Environmental policies and programs frequently have to be designed and implemented by government and industry within the span of short-term cycles of economic activity. These short-term business cycles can give a misleading picture of the long term demand position for an industry's products, and, its strategic strengths and weaknesses in the market place. Clarification of the longer-term economic issues can be helpful in deciding matters of the timing, scope and depth of policy and regulatory actions and also in putting a strategic perspective on business investments.. This section reviews some of the major forces that drive long-term demand and supply in the Canadian and Ontario pulp and paper industry.

Customer Needs Are Driving The Demand For Improved Products

The kind and quality of paper products required by consumers and businesses changes continuously. A P&P Papermaking Report *(Ref #19)* explained the main contemporary trends succinctly:

Future sheet property demands will be driven by the need for higher print quality, increasing printing press speeds, and rising fibre and distribution costs on printing grades. Strength, print quality, and fibre costs will be major factors in future packaging grade developments . A move towards lower basis weights will continue for most grades.

Ontario industry will be expected to move towards future newsprint grade weights that drop from their present average level of 48 g/m^2 towards 40 g/m^2. Newsprint customers will be seeking not just lighter paper but paper that can run at machine speeds which will increase by 30% by the year 2000. Paper quality will be expected to require better opacity, more resistance to print show-through, and greater strength. At the same time, recycled fibre will compete with and supplement virgin fibre. In printing and writing papers, the expectation is that these will contain more recycled materials and manufacturers will meet higher levels of quality concerning the runability of paper on

office copiers and other equipment. Demand increases for some grades will be high over the 1990's. The Computer and Business Equipment Manufacturers Association projects that demand for personal computer printers will increase from current levels of some 9 million a year to some 24 million by the year 2000. This factor will exert a strong influence on the demand for computer printing paper, and cheaper, higher quality printers will use more exacting colour processes which paper manufacturers will be required to satisfy.

Per Capita Consumption Varies Widely, Even Among Advanced Industrial Countries

The consumption and use of paper products correlates broadly with per-capita incomes and the growth of Gross Domestic Product. The level of consumption by households and firms will depend upon personal disposable incomes, on the nature of industry and its packaging and materials needs, and, more recently, on the success of paper and board recycling programs

Figure 10 provides selected international examples of per-capita consumption of all major paper products including newsprint, paper bags, liner boards and writing materials. *(Pulp and Paper International Ref #8).* The United States consumes more paper per-capita than any other nation in the world - some 311 kilograms in 1990. Canada's consumption is a third less at 215 kilograms. and is about the same as Switzerland. The availability of wood supply and a competitive pulp and paper industry does encourage high levels of consumption so that forest resource nations tend to be at the top of the list. However, the relationship to the general standard of living and to the size and packing needs of the export sector are also apparent in countries with high levels of external trade, such as Korea and Taiwan. Japan's consumption in the same year was 228 kg, which places it ahead of Canada but behind the U.S.

In Europe the leaders in per-capita paper consumption were:

Finland	279 kg
Germany Fed Rep -	232 kg
Sweden	231 kg
Belgium	210 kg
Denmark	205 kg
U.K.	165 kg
Luxembourg	164 kg
France	155 kg

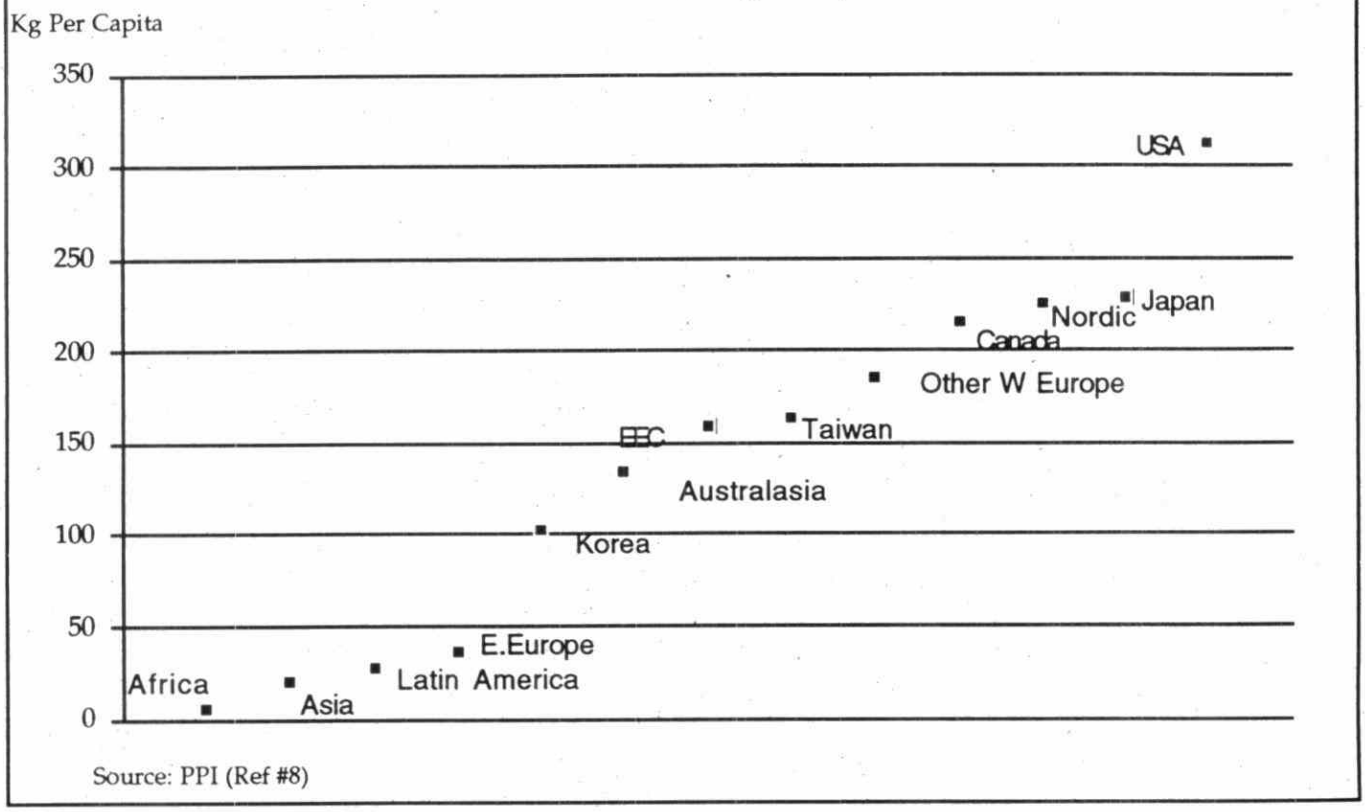
At the lower end of the scale were:

Spain	110 kg
Ireland	98 kg
Portugal	73 kg
Greece	61 kg

The latter are all countries which are in the middle ground of economic development and not the leaders in European standards of living.

Figure 10

Per Capita Consumption
Paper Products
1990 - kg



Source: PPI (Ref #8)

It is evident that among industrialized nations, the differences in paper consumption between the high and low consumption countries remains very wide -- wide enough for a good deal of catching up and a continuous period of demand expansion over the next decade.

The general range of per-capita consumption for developed countries is 100 kg - 320 kg. For under-developed or developing nations the level ranges from a few kilograms a year to 100 kg. Future demand for paper products will therefore depend upon growth in population, incomes and per-capita consumption not only in advanced nations, but also in developing countries. The size of the markets in developing countries is potentially enormous because of the size of their populations.

The disparities shown in *Figure 10* between consumption in rich and poor countries also represent areas of future market opportunity for major producing areas. Some estimates place world demand in the year 2000 as high as 360 million compared to some 237 million metric tonnes in 1990. *(Taylor Ref #17)*

This would amount to a volume increase of fifty percent or more in a ten year period which would be driven by rising world population, increasing per-capita incomes, rising levels of per-capita consumption of paper, and the restructuring of many national economies.

World Demand Is Growing By 3%-4% A Year.

The FAO (*Ref #16)* projects a more conservative trend which would see consumption of all paper and board products rise by 3.4%-3.6% a year with a total consumption of some 300 million tons by the year 2000. These two projections provide a reasonable range of possible outcomes for the next decade -- although the FAO projections seem to provide a more probable outcome because they are based on a methodology which uses, country-by-country and product-by-product projections.

There are, however, other important economic factors in this outlook which derive from the distribution of forest resources, investments in production facilities, and the structure of foreign trade in paper products. *Table 4.1* shows the disparities in consumption and production by major geographic areas of the globe as they were in 1990. The FAO's projections of consumption would not make a significant difference to these proportions by the year 2000.

Economic Restructuring In Many Countries Could Accelerate Demand In The 1990's

The differences in paper consumption and production between the northern and southern hemispheres and between Asian countries and the OECD bloc are very wide. A factor of some significance which will affect the course of world economic development over the next few years will be the extent to which low per-capita income economies with large populations are able to develop more resilient and successful free market economies.

At the present time, many nations in the lower-to-middle per-capita GNP range are undergoing some degree of reorganization of their economies, their public sectors and their market places. The key objective is the removal of barriers to growth and the implementation of economic restructuring programs of the kind introduced by many Third World countries following the widespread fiscal, financial and inflationary crises of the early 1980's. It is an important economic and business planning consideration for the 1990's that the majority of the world's population lives in countries involved in some measure of conscious economic and market restructuring: China, India, Pakistan, Argentina, Peru, Chile, Brazil, Chile, Mexico, Russia and Eastern Europe. If restructuring is successful, it will inevitably produce an upsurge in world demand for paper products as per-capita incomes rise and consumption

follows the historic trends *(Figure 10)* of the more advanced industrial economies.

As world economic growth continues over the next decade, a strong direct role for Ontario's pulp and paper industry in meeting the upward shift in global per-capita consumption does not seem probable. The province's industry to date, has not developed extensive markets outside of Canada and the U.S. and if the current dependency is a fixed one, then the presence of high levels of off-shore demand for pulp and paper may have only an indirect effect on incomes and growth in Ontario.

Continental And Regional Self-Sufficiency In Paper and Board Products

The existing markets show a propensity for continental or regional self-sufficiency in advanced industrial countries. *(Table 4.1)* Trade and commerce policies and the formation of trading blocs have had something to do with this, but a more important factor is the distribution of conifer and deciduous forests across the two continents of the northern hemisphere which has given them a comparative economic advantage in pulp and paper products.

In the Southern hemisphere, large

Table 4.1
Self-Sufficiency in the Production, Consumption of Paper Products
Major Regions and Countries of the World
1990

	Per Capita Consumption Kg	Total Consumption 000's Tonnes	Production 000's Tonnes	% Self Sufficient	Populatioon
Major Regions					
Africa	6	3,569	2,670	75	647,187
Asia	20	61,530	57,101	92	3,111,046
Latin America	26	11,543	10,818	94	438,922
Europe (East)	35	14,950	15,635	105	427,250
Europe (West)	163	58,655	61,661	105	360,740
North America	302	83,456	87,985	105	276,216
Major Producing Countries					
Canada	215	5,724	16,466	288	26,584
Sweden	231	1,961	8,426	430	8,500
Finland	279	12,382	8,958	438	4,950
United States	311	77,732	71,519	92	249,632
World	45	237,107	238,781	101	5,286,878

Source: PPI Annual Review (Ref #8)

competitive resources such as tropical rain forests and plantation eucalyptus are only just emerging. Their availability is also well distributed throughout that hemisphere and the early signs of potential self-sufficiency are showing in vigorous levels of investment in new pulp and paper capacity. However, within the Southern hemisphere and throughout Asia, the distribution of production resources and facilities is uneven. There will be increased exports of pulp and paper products from countries in the southern hemisphere which will compete with North American and European products, especially hardwood pulp; however, the level of total pulp and paper production is not expected to keep pace with the growth of aggregate demand for finished paper products in the developing countries. They will still rely on purchases from producers in the Northern hemisphere to make up the shortfall in supply.

The Surplus Production Capacity of Major Producing Regions Will Increase.

For Canadian producers the gap between the highest and lowest countries of Europe in terms of GNP per-capita means that demand for Canadian products in established European markets could potentially be buoyant over the next decade. On the other hand, the producing countries in that market do not appear to face unduly difficult wood supply conditions, or a lack of production capacity. The addition of competition from Eastern Europe and Russia as their recovery programs attract investors in the resource industries will take some time. Total paper and board consumption by the Eastern European countries is estimated to be some 15 million metric tonnes, compared to the North American consumption of 77 million and Western Europe's 59 million. Those countries have large, untapped forest resources and will be small net exporters of pulp and paper, in the 1990's but they are not considered a source of serious competition at least until the late 1990's. *(Tappi Ref#18)*

The distribution of undepleted wood resources among countries within each continent is uneven. The subsequent need for imports as their economies expand varies widely. This has led to a concentration of pulp and paper production in very few countries and massive one-way trade patterns in both commodities and finished products.

That trend will most likely intensify in future. Woodbridge Reed, *(WRA) (Ref # 11)* has estimated that the regions with surplus paper and board production capacity in the mid-1980's would see these surpluses grow in size through to the early 2000's. Their estimates of the growth in the industry over the 1980's and 1990's saw the producing countries' surplus rising from some 6 million metric tonnes in 1985 to some 16 million tonnes in the year 2000. *(Table 4.2)* North America's surplus capacity in excess of its continental market demand would expand at almost the same rate and size as Europe's. The demand for

Table 4.2
Surplus Production Capacity
For Paper and Board Products
(millions tonnes)

	1985	2000	Change
N America	2.3	7.5	5.2
W Europe	3.8	8.3	5.5
E Europe/Russia	0.1	-3.3	-3.2
Latin Am	-1	-3.7	2.7
Asia-Pacific	-2.6	-3.5	-0.9
China	-0.4	-5.9	-5.5
Africa/Mid Eas	-1.9	-2.3	-0.4

Source: WRA (Ref #9)

product from less developed countries of the world they forecast as outpacing their local production capabilities. This scenario is consistent with a world economy undergoing a significant level of industrial and market restructuring which stimulates high levels of consumption growth in lower income countries.

The implication of this trend in the surplus position of paper producing countries is, that sales efforts could encounter growing and stiffer competition in developed countries. In addition, producers in North America and Europe will be under pressure, because of their surplus capacity, to give more emphasis to selling products in non-traditional markets.

The Outlook Is For A Closer Integration of International and North American Markets

The potential for a strong increase in growth in demand for pulp and paper products by the emerging free markets in the mid and late 1990's provides a stable platform of opportunity for the international sector of the industry. This would not mean an absence of regional business cycle impacts on regional markets. From a production and marketing perspective the strategic and the tactical context will not be the same. It will mean that Ontario producers, even with large markets in the U.S. will be limited in the degree to which they can isolate themselves from the international competitive aspects of the business.

The need to find alternative markets for established products, or, to develop new products for traditional markets will be factors of increasing importance to North American industry. If the balance of production capacity and domestic demand produces progressively larger surpluses of some products in North American markets, new markets may have to be found on other continents and in other regions of the world. With some exceptions Canadian industry does not set technological standards for pulp and paper production and products. It is more likely to find itself pulled along by the competitive strategies and investments of the U.S. competition.

In doing so, there are four specific business issues which the Ontario industry must address in the medium term:

- the U.S. industry's technological and competitive changes
- the U.S. customers' demand for improved and cheaper products

- the emergence of a permanent and growing secondary fibre market

- the possibility of more European competition in U.S. markets

For U.S. producers the pressure may not be to develop new markets so much as to keep the quality products of Swedish, Finnish and Third World producers out of the high-consumption North American market. In technology, quality and product innovation these areas are very aggressively competitive with North America.

North American and European demand growth will continue to shift away from older, commodity-type products towards specialized, high quality, value-added products. In this business climate new investment and technological adaptability will be at a premium. Recent trends in consumer demands which have changed product specifications quite substantially (e.g. packaging, computer papers, office copier and colour printing stock) are already influencing the investment decisions of the North American industry and will continue to do so for some years.

Per-Capita Consumption of Commodities

A possibly constraining element in the growth of Ontario's markets in the United States is the potential for a maturation of markets as GNP continues to grow. Aurell and Poyry *(Ref #11)* make the following observation which is of some relevance to current pulp and paper markets in the U.S.

"Economic growth is no longer accompanied by increased consumption of basic materials such as steel and cement. Markets are saturated and substitution of other materials takes place. The consumption trend for paper is similar to that of other basic materials in many ways."

They examine two relationships in long-term growth, both of which are of interest in understanding the future of North American paper markets. They are, the use and consumption of basic commodities expressed as:

- Their changing contribution to GNP over time

- The changes in per-capita consumption over time.

The experience in the U.S. is that a commodity's share of GNP peaks well before the occurrence of the peak in per-capita consumption; so that total market demand will continue to grow, but more slowly, until there is ultimately a decline in per-capita consumption as the market matures. The consumption maturation process which alters the rate of growth of demand for a commodity over the long-term is brought about by the development of competitive products and substitutes, changes in end-product design, more efficient use of basic materials, and the saturation of markets.

Aurell and Poyry cite the consumption of steel and cement as a case in point. In relation to GNP, demand for both commodities peaked in the 1920's. Other materials, such as aluminum, ammonia and ethylene peaked in the 1970's. For steel and cement per-capita consumption in the U.S. turned down in the 1970's. For other major commodities such as ammonia, chlorine and aluminum the per-capita decline in consumption may have begun in the 1980's. In paper markets, they argue, the long-term process of change shows signs of moving in the same direction as other basic materials. U.S. consumption of all paper grades reached a plateau in the 1950's at just over 20 kilograms per $1,000 of real ($1983) GNP growth. From 1970, the trend was a slow decline to a little less than 20 kilograms. Similarly, showing a lagged relationship to the changing composition of GNP, per-capita consumption of all papers peaked in the early 1970's at around 375 kg and turned down through the 1980's. The 1990 level was 311 kg.

The composition of long-term demand growth for paper products, is however, not constant, and in this respect, Ontario's industry has to deal with the convergence of short-term market cycles and long-term consumption trends which will have an impact on the industry's U.S. markets in the 1990's.

U.S. Per-Capita Newsprint Demand

Of particular concern to Ontario producers of pulp and paper products is the newsprint market. Its driving forces, historically are population growth and per-capita consumption of newsprint products. The latter is driven, in turn, by real income growth. *Figure 11* shows the thirty year history from 1960 - 1990 of the relationship between the annual percentage changes in per-capita real GNP in the U.S. and annual percent changes in the per-capita consumption of newsprint.

The relationship between the two factors over time has been relatively close with peaks and troughs in conformity with one another. However, the figure shows that since the mid-1970's the swings in newsprint consumption which accompany changes in real per-capita income have become distinctly less pronounced. As a result, the range of annual growth performance in newsprint has narrowed. In part, this is because of other demand trends, of a long-term nature which will continue to affect the growth of U.S. newsprint markets in the 1990's.

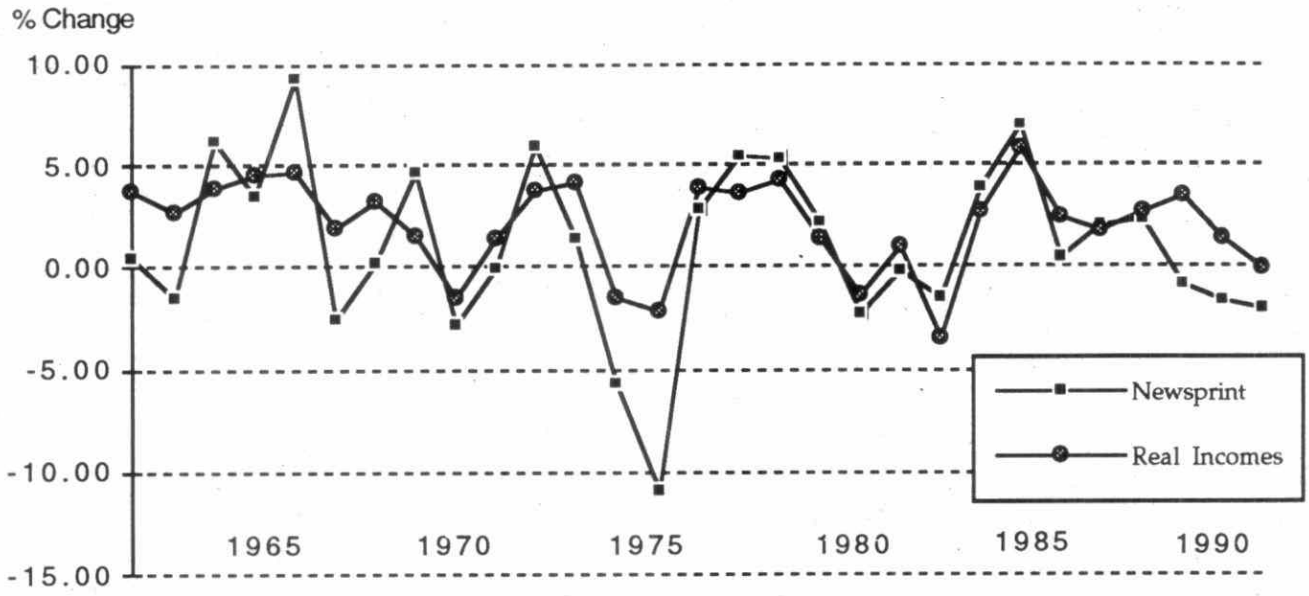
Figure 12 and *Table 4.3* plot two of those demand characteristics:

- Per-capita consumption in kilograms
- Kilograms per $10,000 of real GNP ($1982)

The two trends have moved in opposite directions and have had the effect of offsetting one another to a degree. In the early 1960's, per-capita consumption of newsprint in kilograms

Figure 11

Annual Rates of Change in Per Capita Consumption of Newsprint And Per Capital Real Incomes 1962 - 1991



Sources: U.S. Department of Commerce and Bureau of Census (Ref # 13 & 14)

was in the low-30's. By the mid-1970's, it had risen slowly to the 35 kg per capita, and by the late 1980's it had risen further to 44 kilograms per capita. The peak was in 1987 at 45 kg and since then, the trend has been one of gentle decline.

Table 4.3
U.S. Long Term
Newsprint Consumption Trends

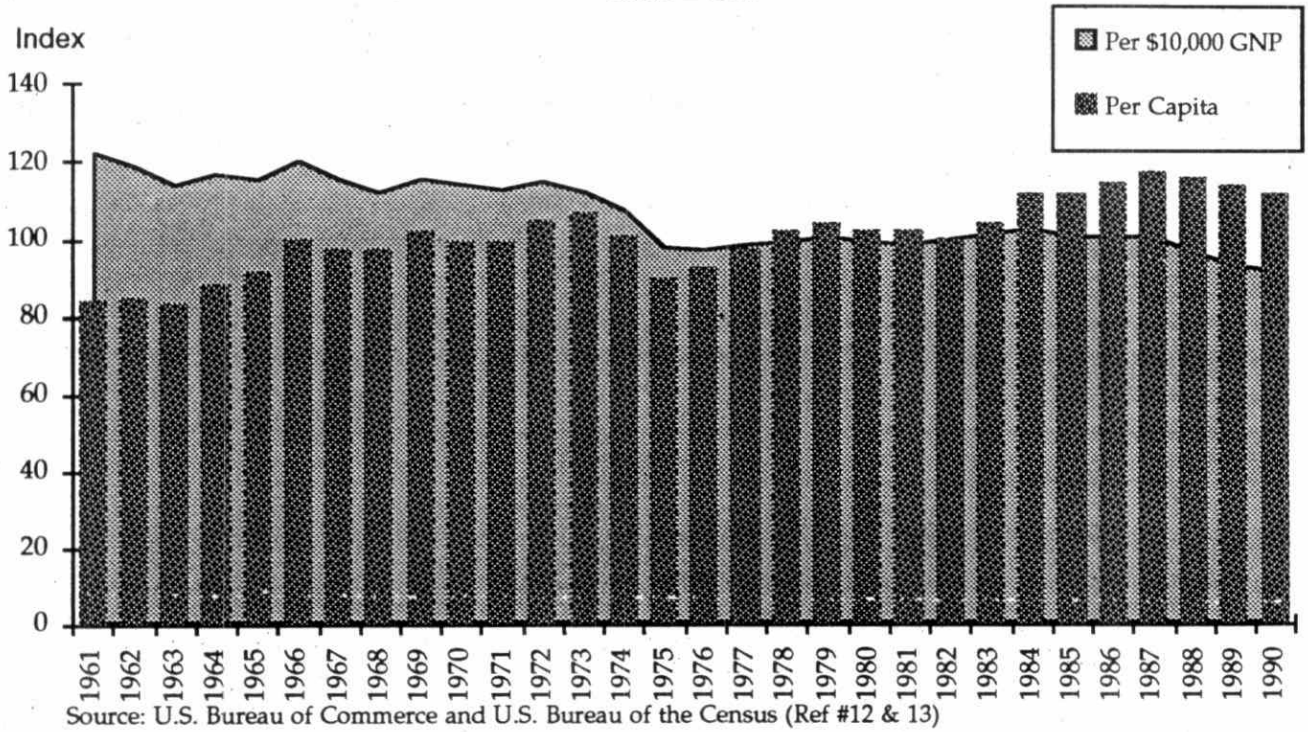
Year	Per Capita	Per $10,000 of GNP ($1983)
	Kg	Kg
1961	33.2	35.5
1965	36.1	33.4
1970	39.2	33.1
1975	35.3	28.3
1980	40.3	28.7
1985	44.2	29.0
1990	44.1	26.5

Source: Bureau of Commerce (Ref #13 &14)

The uncertain issue in the near and medium term is whether the relationship between population growth and newsprint consumption will hold and be reflected in the next cyclical upturn. Previous downturns in the economy and the drop in per-capita real income growth have been accompanied by a decline in per-capita and absolute levels of newsprint consumption in U.S. markets. However, the recovery from those periods saw per-capita consumption rise beyond the earlier peaks and industry cash flows functioning in a healthy condition.

Figure 12

U.S Newsprint Consumption1961 - 1990
1982 = 100



Source: U.S. Bureau of Commerce and U.S. Bureau of the Census (Ref #12 & 13)

The experience with newsprint's share of GNP has been the reverse. The amount of newsprint required to service each $10,000 of real GNP (measured in $1982) has dropped by almost a quarter over the thirty-year period from 35.5 kilograms to 26.5 kilograms. The volume contribution to real GNP growth has dropped during recessions and continued to declining after recovery. *(Figure 12)* It would be in keeping with historical trends therefore, to expect that the level of utilization of newsprint per unit of GNP will continue to drop -- or, put another way, its use will become even more efficient, other products will be used as substitutes, and less will be needed for each increment of real growth in the U.S. economy.

U.S. Medium-Term Demand For Newsprint and Other Paper Products

Among the structural, demographic and economic forces that will push newsprint demand in the 1990's, it is reasonably sure that U.S. population will not be expanding rapidly. The outlook provided by the Bureau of the Census is for growth of about 1% a year along a "Middle" projection. As outlined above, there is some uncertainty in the outlook for per-capita consumption of newsprint in that the

figures show a downward trend which began in 1987 -- ahead of the economic downturn. This decline may be because of a deterioration in demand and/or, it may signal the beginning of a long term saturation of the market. The resurgence and growth of per-capita consumption in the past decade and a half may well have come to an end.

Figure 11 shows that per-capita real income growth in the U.S. is most likely to occur in the range of 1% - 3% a year. As outlined earlier, there is a close relationship between annual change in per-capita consumption of newsprint and the annual rate of change in real per-capita incomes. If that relationship continues, the growth in newsprint consumption should also stay close to the trend growth of real per-capita incomes. It would therefore not be unreasonable to expect the medium term annual market growth trend to be in the range of 1.5% - 2.5%. The long-term history indicates the possibility of a short-term surge in newsprint demand of up to

Figure 13

Long-Term Trend in U.S. Newsprint Sales
1961 - 2000
(000's Metric Tonnes)

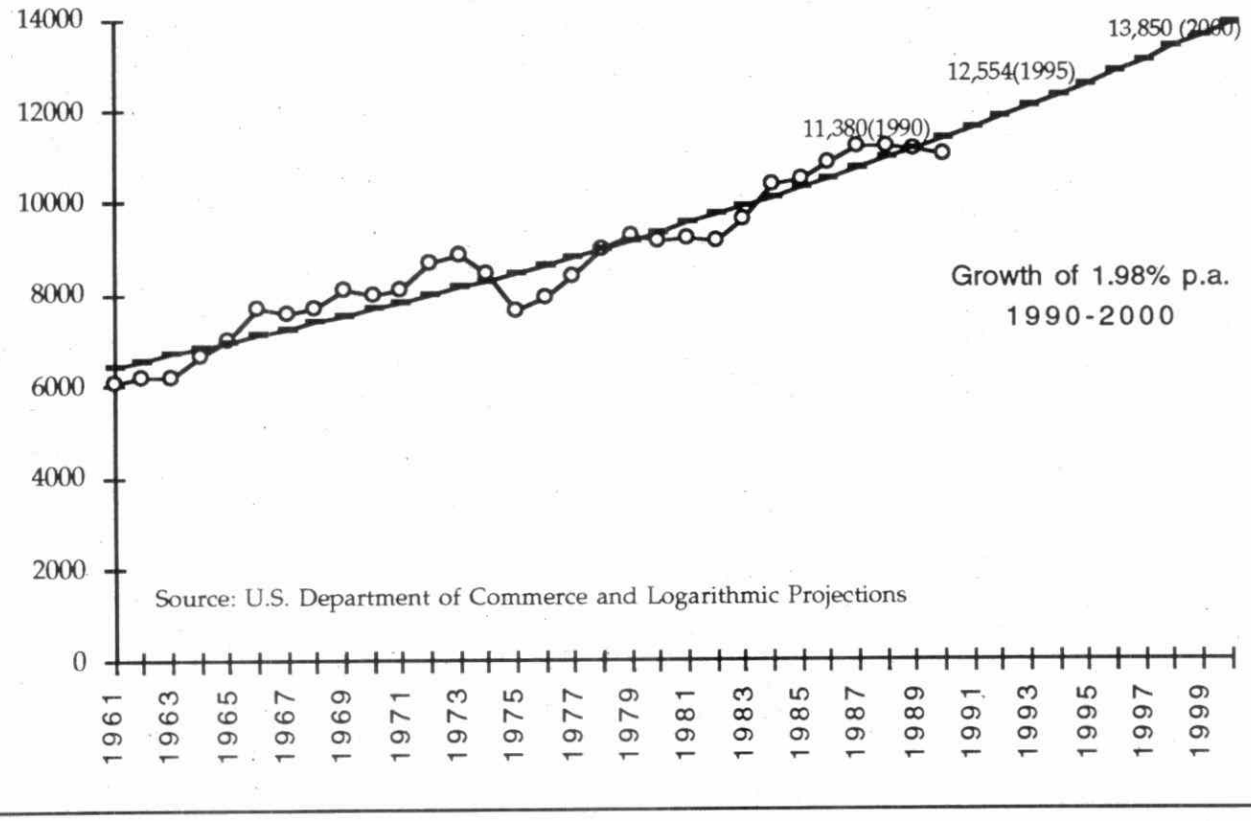


Table 4.4 U.S. Newsprint Trend Consumption Year	000's tonnes
1990	11,380
1991	11,605
1992	11,836
1993	12,070
1994	12,310
1995	12,554
1996	12,803
1997	13,057
1998	13,316
1999	13,581
2000	13,850

Source: Bureau of Commerce (Ref # 14) and estimates

5% annual growth as the North American economy moves out of the recession and back towards trend; but, this would be followed by a more modest trend rate of growth over the early and mid- 1990's.

Figure 13 provides an exponential plot of the long-term trend in newsprint demand in the U.S. When projected to the year 2000 (*Table 4.4*) it shows a forecast annual rate of growth in demand to the year 2000 of just under 2% a year which appears to be consistent with the convergence of long-term trends and the projection of 2.1% by the FAO for U.S. consumption. (It should be noted that U.S. Department of Commerce statistics for "consumption" differ slightly from CPPA "demand" figures) Using this projection, U.S. newsprint consumption would increase by some 2.5 million metric tonnes in the decade - a gain of about 22% from 1990 levels of consumption - 11 million metric tonnes. A return to "trend" over the decade would involve an increase of close to 26%, or 2.8 million metric tonnes.

A return to the 1995 "trend" value of consumption from the actual 1990 levels would see U.S. consumption up by about 1.5 million tonnes or 14%. Within any five year span it would seem likely that the actual consumption would cross over the trend line and exceed it for a period of time. This "return to trend" projection could be conservative for some of the period out to 1995.

Packaging Has Declined In Importance But Printing and Writing Papers Are Expanding Rapidly.

The main deceleration in per-capita consumption and GNP-related growth has been in packaging: the rate of substitution (plastics) has been high. Tissue products now appear to have a relatively saturated market with stable per-capita consumption.

In the cultural papers area, the long-term trend appears to be upward. The principal influences that have formed this expansion are: the growth of service and information industries; the spread of copying machines and computers; and the use of higher-grade papers for colour-printed advertising. The impact on printing, writing and coated papers has been a steady expansion of U.S. per-capita demand over the 1970's and 1980's from a low of about 35 kilograms in 1975 to over 55

kilograms in the late 1980's. Similarly the growth in the content of these higher-quality papers in real GNP has expanded from just over 2.5 kilograms per $1,000 of GNP ($1985) to more than 5.5 in the late 1980's. Interpolating the graphical materials of the Aurell-Poyro analysis provides one set of estimates of world-wide industry product growth trends in the 1985 - 2000. These are shown in *Table 4.5* .

Table 4.5
World-Wide Trend Growth
1985-2000

Coated mechanical printing and writing	4.75%
Coated woodfree printing and writing	4.00%
Uncoated woodfree printing and writing	3.50%
Uncoated mechanical woodfree printing and writing	2.75%
Tissue	2.75%
Newsprint	2.40%
Linerboard and fluting	2.10%
Cartonboards	1.90%

Source: Aurell-Poyry(Ref#12)

Using Gross Domestic Product trend growth and income elasticities of demand, the Food and Agricultural Organization *(Ref #17)* in a 1986 publication projected average annual demand growth for pulp and paper products in North American markets. They are provided in *Table 4.6*

The FAO projections understate the actual performance up to 1990, but since they are trend-based and not cyclical forecasts, they will probably emerge as directionally correct in the current period of recession and beyond. The projections provide a valid picture of the emerging state of North American demand.

Table 4.6
North American Demand Growth for Paper Products

	1990-95	1995-2000
Newsprint	2.1%	2.1%
Printing & Writing	3.2%	3.2%
Other paper, board	0.6%	0.6%
Total paperboard	**1.6%**	**1.7%**
Total Pulp	**2.0%**	**2.1%**
Waste Paper	**4.1%**	**4.1%**

Source: FAO (Ref#16)

In packaging, recent changes in U.S. transport regulations (Rule 41) permit the redesign of board so as to use higher levels of recycled fibres and fillers in linerboards - up to 100% OCC (Old Cardboard Containers) is now not unknown in the industry.

The overall projection is one of a more demanding market in newsprint and linerboard, with volume growth at less than GNP levels -- possibly half to two thirds that of real growth. Product innovation expectations are high, and the industry In North America is expected to make large gains in the use of recycled fibres.

The Main Influences On Future Prices

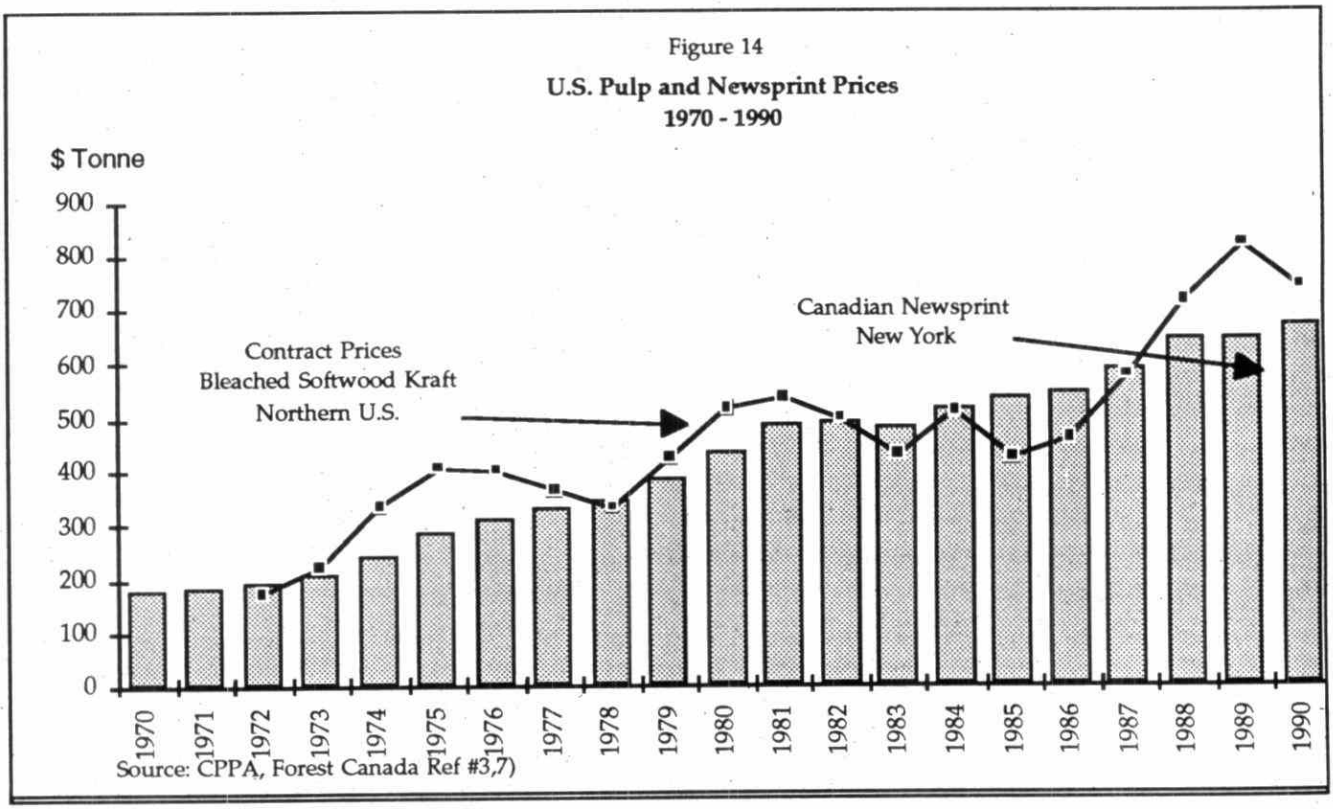
Figure 14 shows the historic movements of pulp and newsprint prices in the Northern U.S. -- which is where Ontario and Quebec producers would probably have the most influence on price and supply conditions. The pulp and paper industry's production and pricing prospects over the next five years will determine much of the scope for investments in environmental and productivity improvements. The long-term price history of the newsprint sector is one of relative stability in its upward movement compared to wood pulp. The rate of increase has generally followed the business cycle quite closely.

Figure 15 provides a broad historical snapshot of the industry's "real price" situation using a broad-spectrum pulp and paper industry selling price index for the period 1970 - 1990. Deflating the current price index by the Canadian GNP deflator shows a relatively flat real price performance. The central conclusion to be drawn from this data is that industry's price actions (mainly the Ontario, Quebec and Atlantic companies) have tended to match inflation in the economy at large.

The price situation for pulp and paper products does not readily lend itself to projections of a simple order. The business cycle does seem to have a strong influence on industry pricing practices. There are a number of struc-

Figure 14

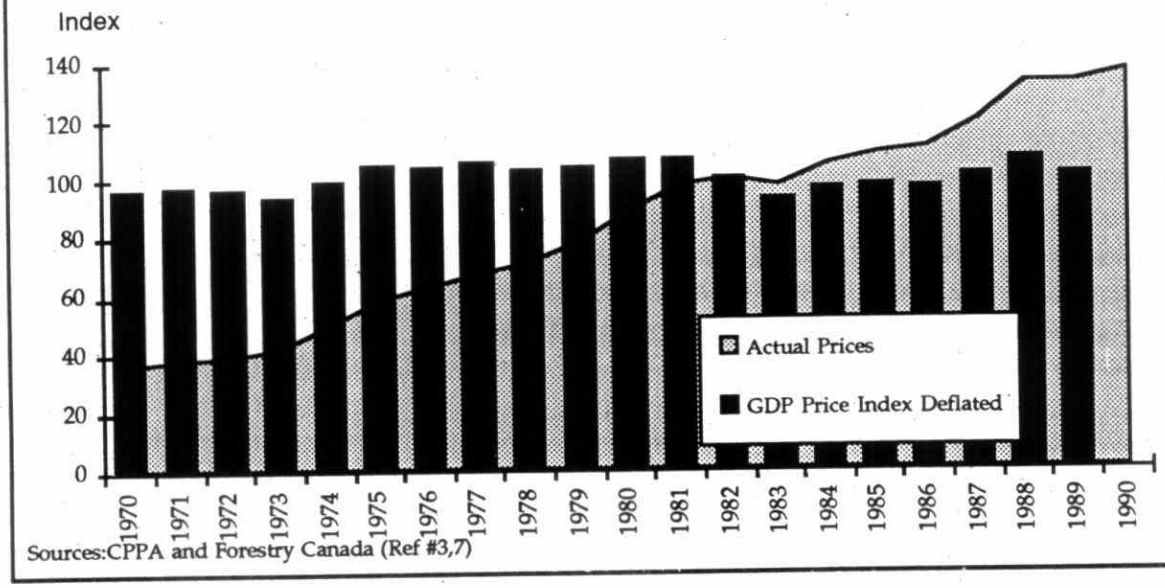
U.S. Pulp and Newsprint Prices
1970 - 1990



Source: CPPA, Forest Canada Ref #3,7)

Figure 15

Canadian Newsprint
Current and Real Price Indexes
1970 - 1990
1982=100



Sources:CPPA and Forestry Canada (Ref #3,7)

tural economic factors which will blend to create the price climate:

- The main products - such as newsprint and pulp - where most of Ontario's production is focused - do not have strong long-term consumer trends working to their advantage

- Under-utilized capacity is higher in Canada than the U.S. and pulp and paper capacity is still growing in North America - secondary fibre supply and demand will increase this downward pressure on prices over the next five years.

- Newsprint plant and equipment in Ontario is not as new and as efficient as the growing capacity in the U.S. - this will increase the possibility of lower prices plus mill shutdowns.

In summary, the competitive and pricing environment has stiffened. The current surplus capacity, plus the entry into the market place of significant volumes of secondary fibres, (backed by government support in many jurisdictions), will complicate the pricing climate for Ontario producers. Ontario's industry has emerging and potential strengths in the non-newsprint areas of production, but the current indications are that this side of the industry is not growing as rapidly as it is in other parts of Canada and the U.S.

5. CONCLUSIONS

The pulp and paper industry in Ontario has been a strong contributing force in the province's regional development. This contribution may change in future years. The industry has entered a period when its structural problems will surface and lead to difficulties in meeting competition from secondary fibres and from growing U.S. capacity in a wide range of products. The possibility of more plant closures and significant restructuring over the 1990's cannot be ruled out. Further research is required to better define aspects of the industry's environmental economics, such as a fibre strategy, which can be used to position environmental policy for the industry in the context of sustainable development.

This review of the broad competitive conditions of the Ontario the pulp and paper industry was undertaken as part of the MISA review. It has, however, identified a number of key areas where many aspects of environmental policy intersect with the Province's economic and industrial policy concerns. The review has outlined six major considerations which, because of their economic significance, will affect the timing, scope and effectiveness of Ontario's environmental measures in future years.

1. The pulp and paper industry is a significant force in Ontario's regional economic development. It has special impacts in nine communities in Northern Ontario communities where a quarter to a third of the work force is employed by the industry. The economic development provided by the industry in these communities would be expensive to replace with equivalent public sector development programs.

2. Ontario's share of the Canadian industry's investment has declined from close to 30% in 1975 to just under 19.5% in 1990. Investment in end-of-pipe environmental measures has dropped significantly from earlier peaks. Production capacity in newsprint continues to expand - much of it for recycling ONP. Ontario has played no role in the development of CTMP pulp which, while presenting problems of high energy (electrical) costs, have been encouraged in Sweden and Quebec for environmental and economic reasons.

3. Despite its heavy reliance on technology and the capital-intensity of its operations, the Canadian (and the Ontario) pulp and paper industry spends less than a third of one percent of gross sales revenues on research and development -- compared to 1.2% for manufacturing generally and 5%-

15% in many hi-tech, innovative industries .

4. The Ontario pulp and paper industry is more dependent on the U.S. market than the industry in Quebec, Atlantic or Western Canada. The continuing growth of new, efficient capacity in pulp and paper recycling facilities in the U.S. will therefore put increased competitive pressure on Ontario newsprint producers in the 1990's and threaten further erosion of market share. On the positive side, the Ontario industry has expanded its capacity in non-newsprint products which are also growing areas of North American demand - although the industry in other provinces has increased capacity to meet these emerging areas of demand more rapidly than the Ontario sector.

5. The newsprint industry in Ontario is deficient in world-scale machines and has high labour inputs -- as a result it is less efficient than its U.S. competitors. It now faces a period in which there is a distinct probability of significant restructuring and closures.

6. The outlook for long-term U.S. newsprint demand is for trend annual volume growth rates of about 2%, with the possibility of stronger rates in the near term as the economy returns to trend. Other paper products, such as printing and writing papers (in which Ontario does not have a predominant strength,) will see growth in excess of 3% a year. Market competition will increase when secondary fibre plants, with large scale and lower materials and fuel costs come on stream in the U.S. and Canada. Mills in Northern Ontario will be economically disadvantaged by their remote location from "urban forests" and by the difficulties and costs of adapting small plants for recycled paper.

The industry shows signs of needing a substantial revival of its technological and investment underpinnings in order to be able to compete in North American markets. In addition, it's market dependence on the U.S. is a constraining influence in a global situation where new market forces will be unleashed by economies of the Third and Developing Worlds which are undergoing restructuring. This underlying technological deficiency also has implications for the achievement of sustainable development and some suggestions concerning its place in future environmental economics research have been outlined below.

Issues for Further Research

The pulp and paper industry occupies a unique position in the economic and social fabric of the province -- and it correspondingly raises many issues for public policy research. There are three key areas of concern for environmental policy which have emerged from the *tour d"horizon* of the issues of competitiveness as outlined in this report. The role of the industry in an approach to sustainable development is central to all the of these concerns. Given the correct elements of policy and programming, the concept of sustainable development can be linked to

a "fibre strategy". At the present time, it is not possible to define how such a system would articulate -- its main components need exploration and clearer definition. For example, a development strategy which encourages an increase in "value-added" output will have a future impact on the environment and on the consumption of the forest resource. Value-added is not yet adequately measured so as to apply it in a practical way to a fibre-strategy. To improve the links between environmental policies and sustainable development therefore requires a better definition of a fibre strategy and all of its components as a preparatory step to undertaking more detailed work on the options and the actual content of such a strategy.

Research Task 1: *Define the main elements of a "fibre strategy" for pulp and paper in Ontario - illustrate the components of an approach to the environmental economics of sustainable development,*

This definitional exercise would include the cross-linkages between environmental policies and other policy areas such as:

- "value-added" development
- skills development
- forest inventory management
- forestry agreements
- technology and development

The research would also include an inventory of the areas requiring additional data in order to construct an environmental economics approach to sustainable development e.g. improved value-added data for wood-consuming industries

The present report brings out the importance of science and technology for the industry in other areas of the world, and the low priority given to it by the Canadian and Ontario industry. This may present a serious barrier to the implementation of improved environmental controls, since these depend upon the presence of a science and technology culture in industry which is receptive to change and innovation.

Research Task 2: *Define the policy approaches, and the elements and roles included, in selected jurisdictions where science and technology is used successfully to improve the environmental economics of industry, and to reduce the economic barriers to enhanced environmental protection programs .*

This research would include a review and description of the principal *economic and environmental policy processes* which bring about a more effective use of skill and knowledge to ensure improved foundations for sustainable development. The two countries with policies of this order are Sweden and Finland, although certain aspects of selected U.S. state-level policy might also apply.

This report has also examined the issue of relative efficiency of Ontario's newsprint machines versus those in other jurisdictions. Additional infor-

mation on the issue of size, efficiency, scale of non-newsprint plants and pulp plants would be useful in understanding the industry's competitive scope for absorbing the costs of improved environmental abatement programs.

Research Task No 3. *Estimate and document the relative scale of operations for the production of non-newsprint commodities and products in the Ontario pulp and paper industry. Compare them with those for the industry in selected states in the U.S. and with other provinces.*

This research would go to the plant level and provide supportive information for use in other areas of environmental economics, such as the role of technical efficiency in achieving sustainable development, or, the place of efficiency measures in defining and implementing environmental standards.

There are other areas of research which arise from this report. Those suggested above appear to relate most directly to the immediate problems and tasks for environmental economics and the application of environmental policy to the pulp and paper industry around the Great Lakes.

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